

MICROCOPY RESOLUTION TEST CHART NATIONAL BUREAU OF STANDARDS-1963-A

## **CONTRACTOR REPORT**







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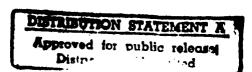
# **Creating Security System Models Using SNAP-PC**

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#### CREATING SECURITY SYSTEM MODELS

USING

SNAP-PC

#### Prepared for:

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August, 1986



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SNAP was originally developed in the late 1970's by Pritsker & Associates, Inc., for Sandia National Laboratories. Funding was provided by the U.S. Nuclear Regulatory Commission and the U.S. Navy.

SNAP-PC was created to satisfy two fundamental needs, the first of which was to give individuals who did not have access to a host computer the power of using simulation analysis to evaluate security systems. The other was to simplify the simulation process so that a person knowledgeable in security planning and who had little experience in simulation techniques could use simulation in his evaluation of security systems.

SNAP-PC was developed by Pritsker & Associates, Inc., for Sandia with funding provided by the U.S. Army Military Police School (USAMPS) and the Department of Energy, Office of Safeguards and Security.

The authors of this document would like to acknowledge those individuals who significantly contributed to the development of SNAP-PC. The original design of SNAP was developed by Dr. Floyd H. Grant now president of FACTROL, Inc. Dr. Grant was also instrumental in the early design phases of SNAP-PC. Doug MacFarland, also with FACTROL, Inc., was extremely helpful in the development of the user support program's.

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#### **EXECUTIVE SUMMARY**

SNAP-PC (Safeguards Network Analysis Procedure for the Personal Computer) is a user-friendly version of SNAP designed for IBM XT or AT compatible microcomputers. SNAP is a simulation-based analysis technique supporting the evaluation of fixed-site security systems to prevent theft or sabotage of a specified target. Through SNAP the user is able to define the facility, the sensor system, the guard operating policies and response tactics, and the adversary's attack plan.

SNAP uses the system definition to analyze its effectiveness in defending against specific threats. The system performance statistics measured by SNAP include:

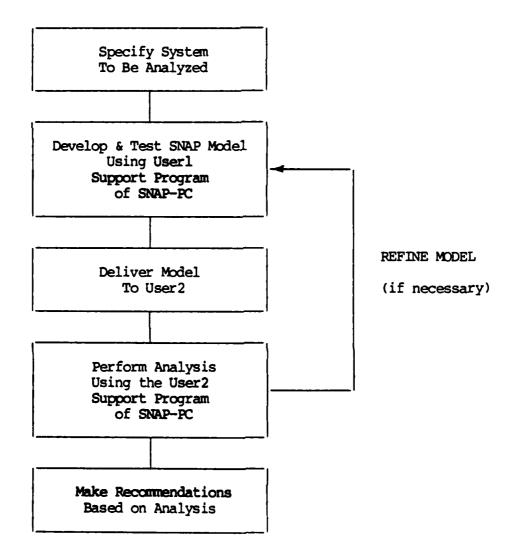
- Adversary mission success probability;
- 2) Guard and adversary casualties;
- Duration of engagements;
- 4) Outcome of engagements,
- 5) Duration of scenario by outcome (adversary success/fail), and
- 6) Adversary duration by facility location.

The development of SNAP began in the late 1970's for use on a mainframe computer. The mainframe version of SNAP, along with its graphical model manager, SOS, significantly reduces the task of analyzing security systems. The effort of putting SNAP on a microcomputer was undertaken to place this aid into the hands of a larger number of people who might not have the specific hardware required by the mainframe system. In addition, user support

programs were developed which greatly enhance SNAP by providing efficient model management and output analysis capabilities beyond those provided by SOS.



The task of effectively analyzing a security system requires significant effort. This manual deals with the construction of a model of a security system by a skilled model builder knowledge—able of SNAP analysis techniques, Userl. The actual evaluation of the security system is usually performed by a security system analyst or on-site C.O. unfamiliar with SNAP, User2. This process, as shown in the figure shown below, is reduced to a manage—able level by the SNAP-PC support programs.





The Userl Support Program for SNAP-PC greatly reduces the time previously required to model a facility by providing:

- graphical network builders for the entire modeling task,
- inherent database management for the different scenarios
   created for a particular facility,
- input data generators that automatically prepare the model for SNAP analysis, and
- capability to parameterize the model in such a way that sensitivity analysis of factors such as patrol force size, patrolling policies, etc., can be performed without editing the model.

After the model has been delivered to User2, the systems analyst can begin to evaluate how well the security system performs against a myriad of potential attack/defense scenarios. The User2 Support Program eliminates the need for User2 to deal with the large amount of performance data generated by SNAP and greatly speeds up the process of analyzing scenarios. In addition to the full capabilities of the mainframe version of SNAP, it provides:

- inherent database management for the collection,
   organization, and reporting of scenario performance
   measures,
- rapid sensitivity analysis through the use of a versatile question-response editor that can be used to alter patrol force size, weapon types, etc., and
- on-line animation of force movements, engagements, and neutralization.

The SNAP-PC package provides a compact analysis tool that can be used to analyze a wide variety of security systems. It places SNAP, a proven evaluation technique, in the hands of onsite personnel, not just computer analysts. The support programs eliminate the labor intensive tedious task of organizing and sorting through reams of output reports and greatly reduce the time previously required to analyze a security system.



#### 1.0 INTRODUCTION/OVERVIEW

This document provides a detailed explanation of the use of the Userl Support Program that has been developed to aid the user in the building of SNAP models. This manual will explain how to install the program on your microcomputer and how to build SNAP models using the program. In addition, it will explain how to prepare models for execution and analysis by User2.

#### 1.1 SNAP - History and References

The Safeguards Network Analysis Procedure (SNAP) is designed to assist users in the evaluation of guard/adversary force engagements at fixed sites. Through SNAP symbols, you will define the security system by outlining both the physical aspects (buildings, fences, sensors, etc.) and the procedural aspects (guard patrols, etc.). After defining the system, SNAP plays-out, or simulates, an attack to determine the likelihood of the security system successfully defending the site. Through re-definition of the security system (i.e., changing guard patrol procedures) and resimulation with SNAP, you are able to identify possible improvements to the system.

SNAP was developed late in the 1970s by Pritsker & Associates under contract to Sandia and the Nuclear Regulatory Commission. The first installations of SNAP included the evaluation of nuclear power facilities and their security systems. In later years SNAP has been used to evaluate securities concerning nuclear submarines and nuclear weapon sites.

Further information on SNAP can be found in the User's

Manual entitled The Safeguards Network Analysis Procedure

(SNAP): A User's Manual, listed under Document Code NUREG/CR
3423 or SAND83-7123. In addition, several articles have been written describing SNAP analyses. These are listed in the section 'REFERENCES'.

#### 1.2 User1 versus User2

The work of building and then analyzing SNAP models can be easily divided between two user groups, Userl and User2. Userl has the responsibility for developing basic SNAP models and then building those models using the Userl Support Program. User2 executes the models and performs the analysis. In our initial evaluation of the two users, Userl should be knowledgeable of IBM-compatible microcomputers and be trained in SNAP and its functions and capabilities. In addition, Userl should, to a limited extent, be knowledgeable in the security systems that are to be analyzed. User2 should have a passing knowledge of microcomputers, an understanding of SNAP and its basic purpose, and a detailed understanding of the security system to be analyzed.

#### 1.3 Submodel Breakdown

To aid Userl in building SNAP models, the user-defined SNAP model is broken into five major submodels. These are the Facility Submodel, Control Submodel, Adversary Detection Submodel, Guard Submodel, and Adversary Submodel. To perform a SNAP analysis or simulation, you must combine one of each of these submodels.



The Facility Submodel defines the environment of the SNAP analysis. Typically, it identifies buildings, fences, and open spaces. The Facility Submodel must identify a target. The Control Submodel defines the parameters and status variables that the user wants to use throughout the other submodels. The facility's sensor-signal transmission system is defined using an Adversary Detection Submodel. The Guard Submodel outlines the course of action that guards take during normal patrols. In addition, it defines the response action guards would take when sensors are triggered or in some way an adversary is detected in the environment. The adversary's attempt to sabotage or steal the target is defined in the Adversary Submodel.

Userl will build only one Facility Submodel and one Control Submodel for your security system. However, you may be provided with numerous Adversary Detection, Guard, and Adversary Submodels. This will allow you to study particular aspects of your security system with greater ease. For example, you may be given two Adversary Submodels: SOUTH and EAST. The SOUTH scenario might detail an adversary attack on the southern perimeter of a guard facility, etc. A detailed breakdown of the SNAP nodes and statements that is covered by each submodel is listed in Appendix A.

#### 1.4 Modeling Approach

As described in Section 1.3, a single SNAP model contains five different submodels. Using the Userl Support Program you will develop these submodels in a working space on your microcomputer. Typically, the first submodel built is the Facility

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Submodel describing the environment of the SNAP analysis. Only one Facility Submodel is included in a working space. Then it is your responsibility to build the remaining submodels as necessary for your analysis.

Since most of the submodels are of a network nature, the submodels can be built graphically on your microcomputer screen using the support program. Those portions of the model that are not in a network form are supported by a forms input. After these models are built, they are translated to SNAP input statements for later execution and analysis.

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In addition to building the SNAP model as described in the SNAP User's Manual, you may also build a series of questions to be used by User2 to supply necessary data to prepare the model for analysis. For instance, you may choose to allow User2 to determine the accuracy of a sensor. Therefore, as you build the model you will not want to supply that piece of information, but allow User2 to be prompted for that data. Therefore, in addition to building the five submodels, it will be necessary to develop the set of questions that will be issued to User2, the Master Prompt Query Database. For each question in the Master Prompt Query Database, you will specify an acceptable range of answers and a default answer. The default answer will be used when the user does not wish to address the question. The procedure for creating a Master Prompt Query Database is discussed in Section 8.0 'GIVING USER2 CONTROL'. After building the submodels and the Master Prompt Query Database, it is suggested that you thoroughly test your model before making it available to User2.



As a beginner you may wish to build your initial model without any missing data which requires prompts to User2 and execute the model in that state before adding the prompts. The User2 manual will explain the process of supplying responses to the prompts that have been identified and executing the model.

#### 1.5 Things You Should Know

This manual is written as a user-friendly companion to SNAP-PC and the Userl Support Program. Each of the following sections, from Section 2.0, 'INSTALLATION OF SNAP-PC SOFTWARE ON YOUR MICROCOMPUTER', through Section 11.0, 'PREPARING THE MODEL FOR USER2', covers an aspect of using the Userl Support Program. Within each section you will be led step-by-step through a different stage of a model development.

This section provides the basic syntax rules used to describe the commands you will use and some of the basic features described on the menus you will see on your console screen. The 'GLOSSARY OF COMMON TERMS' and the 'INDEX' at the back of this manual provide valuable aid in using this manual and should be reviewed by the first time user of the Userl Support Program.

#### 1.5.1 Syntax Rules

When you read the phrase, enter [USER1], in this manual, you are requested to type the letters U, S, E, R, and 1, followed by hitting the [RETURN] or [ENTER] key on your console. The phrase, type [A], means you should hit the letter 'A' key once and nothing

else. Certain commonly used keys will be abbreviated, such as [ESC] for the escape key and [PgUp] for the page up key.

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#### 1.5.2 Basic Features of Menu Screens

The menu screens printed in this manual are actual copies of a console screen that should differ very little from the ones you will actually see. The generic menu selection screens shown in this manual will be the same ones you will see at your computer terminal.

The basic features of a Userl Support Program menu include a line of description across the top, a line of command options along the bottom of the console screen, and a title. The description tells you where you are and what to do if you make a mistake. The command options tell you how to move about the menu and what commands are available to you. These are explained in more detail later. Each menu's title, such as 'GUARD SUBMODEL SELECTION MENU', uniquely identifies the menu.

When a menu first appears on your screen, the first line which you can select or write to will be shown in reverse video. On the bottom of the screen will be a list of processing commands from which you may choose. For example, if you are shown a menu containing a list, you may use the cursor arrow keys to move about the menu ( or - to choice). Or, you can hit the return, or enter, key to select an entry on the list ([RETURN]). Typing a question mark (? - Help) at almost any point in the Userl Support Program will cause a descriptive help message to be printed on your screen.



The help message associated with each menu screen printed in this manual is listed on a page following the menu for your reference.

Hitting the escape key, [ESC], boldfaced on the top of your screen, is your panic button when you make a mistake and easy-out when you get into a set of nested menus. The back arrow to the left of [ESC] on your screen points to the title of the menu you will be shown if you type [ESC]. For example, you may find yourself somewhere inside the Adversary Detection Submodel portion of the Userl Support Program and decide you want to look at a Guard Submodel. You can quickly and safely retreat back to the point where you can choose to look at the Guard Submodel by hitting [ESC]. After each 'escape' you will be pointed to the next prior menu, back to the first menu in the support program.

The basic panic feature of [ESC] is good for morale, but is not necessary. The only permanent damage that you can do to your data is to delete a submodel or working space. There is a redundant, "Are you sure?", at each of these points to prevent you from making a mistake.

#### 2.0 INSTALLATION OF SNAP-PC SOFTWARE ON YOUR MICROCOMPUTER

When you, as Userl, execute one of the support programs developed for SNAP-PC, you are actually submitting a batch job to the PC through DOS. The batch job executes a program located in a subdirectory on your fixed disk and that program, through the C-language 'system' command, calls a myriad of other programs based on your interactive menu selections.

This section provides the specifications for the micro-computer system that the SNAP-PC programs were designed to run on, the procedure to install the SNAP-PC programs on your fixed disk, and the miscellaneous information you will need to execute the programs.

#### 2.1 Hardware Requirements

Table 2.1.1 lists the equipment that SNAP-PC is designed to run on. Both the IBM XT and AT come equipped with sufficient hard disk space to get you started. If you are using your microcomputer for other work or you are planning on keeping numerous copies of old runs on the disk as back-up, you will want to buy as much space as you can get. See the section 'Disk Space Requirements' for some rough figures on data file size.

The IBM XT is significantly slower than the IBM AT and the difference is quite noticeable during a side-by side comparison.

#### Table 2.1.1: Hardware Requirements for SNAP-PC

Computer

IBM XT or AT with:

10 megabyte fixed disk (minimum) 512k memory (minimum) 80287 math co-processor

Monitor

IBM PC Color Monitor (or compatible)

Printer

Epson FX80 (or compatible)

However, during the user-interactive portions of SNAP-PC this difference is not disruptive, but the actual simulation portion of the program will run about three times faster on the IBM AT.

The math co-processor was made a requirement because it significantly speeds up the simulation portion of SNAP-PC and because of the user-interactive graphical model builders. With the co-processor the time it takes the model builders to locate a line in the database is barely noticeable on the AT even in the worst of cases.

The network screens may be printed on an EPSON compatible parallel printer. If you accidently try to print the screens on a serial printer or non-compatible parallel printer, you will get undefined results and will have to reboot your system.

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#### 2.2 Software Requirements

A complete list of the software you will need to take full advantage of SNAP-PC is in Table 2.2.1. The only software that you will need to get started that is not included in the SNAP-PC Installation Package, is the appropriate version of DOS and a file editor such as WORDSTAR<sup>TM</sup>.

The simulation portion of SNAP-PC was written in FORTRAN and was compiled using Microsoft<sup>TM</sup> FORTRAN V3.3. Experienced modellers may want to add their own user functions as described in the SNAP User's Manual. The procedure for doing this is described under 'Adding Your Own User Code to SNAP-PC'.

All of the user-interactive menus and graphics are written in C-86, by Computer Innovations, Inc. This code is not designed to be altered by the user and will not be discussed.

Table 2.2.1: Software Requirements for SNAP-PC

Operating System: DOS 3.0 (or later)

FORTRAN Compiler: Microsoft<sup>TM</sup>FORTRAN V3.3

File Editor: WORDSTAR<sup>TM</sup> (or compatible)

#### 2.3 Loading the SNAP-PC Software Diskettes

The diskettes that contain the SNAP-PC software are high capacity (1.2M) diskettes formatted on an IBM AT. If you cannot list the directory of a diskette using the DOS (DIR:) command, you will need to get another copy. If you have a double-sided disk drive, you will need to get a copy of SNAP-PC on double-sided

(360KB) diskettes. Since these diskettes cannot hold as much information as a high capacity diskette, SNAP-PC will be contained on more than the identified two diskettes.

SNAP-PC can be installed on your PC using either of two methods. You may install it 'by hand' using the instructions listed through the end of Section 2.3. The simpler method is to use the program LOADTOPC.BAT located on Diskette One to automatically load SNAP-PC to your PC. Simply place Diskette One in your drive a: and enter A:\LOADTOPC. You will be prompted when to change diskettes.

The normal distribution of SNAP-PC is contained on two high capacity diskettes (See Table 2.3.1). To load the software onto your PC you must set up the required subdirectory tree structure. This tree structure is given in Figure 2.3.1.

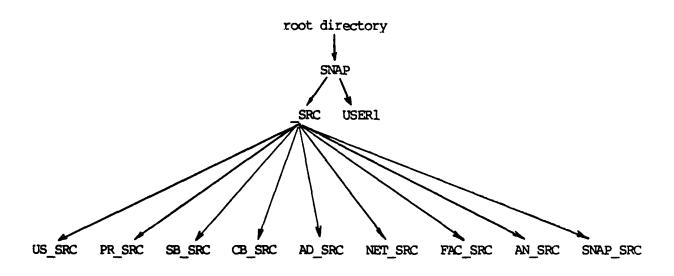
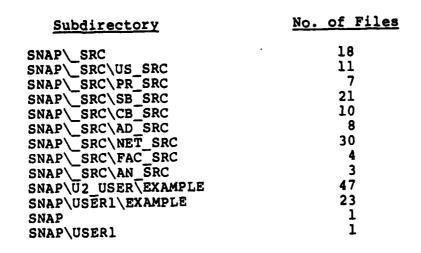


Figure 2.3.1: Subdirectory Tree Structure

## Table 2.3.1: SNAP-PC Software Diskettes

DISKETTE ONE - 'SNAP-PC Executables, Help Screens, and Example Model'



DISKETTE TWO - 'SNAP-PC SIMULATION CODE'

Subdirectory	No. of Files
SNAP\_SRC\SNAP_SRC	453

Each subdirectory is made by using the DOS command (MKDIR). The following set of commands will construct the appropriate tree structure:

Table 2.3.2: Commands Used to Set Up the Tree Structure

CD \	
MKDIR	SNAP
CD	SNAP
MKDIR	USER1
MKDIR	_SRC
CD	SRC
MKDIR	$\overline{\mathtt{U}}\mathtt{S}\_\mathtt{SRC}$
MKDIR	PR_SRC
MKDIR	SB_SRC
MKDIR	CB_SRC
MKDIR	AD_SRC
MKDIR	NET_SRC
MKDIR	FAC_SRC
MKDIR	AN_SRC
MKDIR	SNAP_SRC
	_

You are now ready to load the software diskettes. The diskette which contains the SNAP-PC executables, help screens and workshops is loaded first. There will be a direct correspondence between the subdirectories on the diskette and the subdirectories on the PC. Place Diskette One into your disk drive and change the directory to \SNAP\SRC. Change the directory on the fixed disk to \SNAP\SRC and copy files from the diskette. The following commands will accomplish the task:

Table 2.3.3: Copying Executables

A:
CD \SNAP\\_SRC
C:
CD \SNAP\\_SRC
COPY A:\* \*

This diskette also contains the information associated with the SNAP-PC help screens. The diskette contains subdirectories which are identical to the ones you set up under the \SNAP\SRC subdirectory. You must copy the files under each subdirectory from the diskette to the corresponding subdirectory on the fixed disk. For example, to copy files for the US\_SRC subdirectory, you should type these commands:

Table 2.3.4: Copying Help Information

A:
CD \SNAP\\_SRC\US\_SRC
C:
CD \SNAP\\_SRC\US\_SRC
COPY A:\*.\*

Follow these same commands, changing the subdirectory name correspondingly, for each of the other subdirectories on the diskette.



The example model which is discussed throughout both user manuals is also contained on diskette one. To load the model you must first create an appropriate tree structure for the model on your fixed disk. To construct this tree structure, follow the DOS commands in Table 2.3.5.

Table 2.3.5: Creating the Tree Structure for Example Model

CD \SNAP
MKDIR U2\_USER
CD U2\_USER
MKDIR EXAMPLE
CD \SNAP\USER1
MKDIR EXAMPLE

Once the tree structure is established, you may copy the model contents from the diskette into the appropriate subdirectories by following these commands:

Table 2.3.6: Copying Example Models

COPY A:\SNAP\USERS.SO\_C:\SNAP
COPY A:\SNAP\US\_USER\FACILITY.SO\_C:\SNAP\U2\_USER
COPY A:\SNAP\U2\_USER\SUMRY\$\$\$.LOG C:\SNAP\U2\\_USER
COPY A:\SNAP\EXAMPLE\\*.\* C:\SNAP\EXAMPLE
COPY A:\SNAP\USER1\FACILITY.SO\_C:\SNAP\USER1
COPY A:\SNAP\USER1\EXAMPLE\\*.\* C:\SNAP\USER1\EXAMPLE

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The second diskette contains the source and object code for the SNAP-PC simulation language. If you do not intend to use the user written support subroutine UF, you should not load this diskette as the disk storage requirement is large for these files. The SNAP-PC simulation executable which was loaded from Diskette One will run all models which do not have any user code. If you do intend to write user code, you must load all the SNAP-PC simulation object code, source file UF.FOR, all of the include files and response file RESPl from Diskette Two. The remaining source code need not be loaded. To load, place Diskette Two into the disk drive and copy the indicated files into subdirectory \SNAP\\_SRC\SNAP\_SRC. The commands to accomplish the task are:

Table 2.3.7: Copying SNAP-PC Simulation Code

A:
CD \SNAP\\_SRC\SNAP\_SRC
C:
CD \SNAP\\_SRC\SNAP\_SRC
COPY A:\*.\*.\*OBJ
COPY A:UF.FOR
COPY A:\*.\*.\*INC
COPY A:\*

For information on Using Subroutine UF, see the Section 'Adding Your Own User Code to SNAP-PC'.

#### 2.4 Configuring Your Microcomputer

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To prepare your PC to run SNAP-PC, you must include the DOS command file COMMAND.COM in your root directory and alter two DOS files, CONFIG.SYS and AUTOEXEC.BAT to contain certain commands.

If the files already exist, they will be located in your root directory. There you must edit them to comply with the required format for SNAP-PC.

The CONFIG.SYS file may contain up to eight different commands (reference the DOS Manual for an explanation of these commands). In order to run SNAP-PC four of these commands must be set as indicated in Table 2.4.1.

Table 2.4.1: CONFIG.SYS File Configuration

device = ansi.sys
files = 32
fcbs = 32,32
buffers = 10

The AUTOEXEC.BAT file is a file that DOS looks for when you turn on your computer. You need to include in this file the correct PATH command and the command 'graphics.com'.

### Table 2.4.2: AUTOEXEC.BAT File Configuration

path C:\SNAP\\_SRC;C:\SNAP\\_SRC\SNAP\_SRC
graphics.com

The path command may contain paths to other subdirectories. However, it must include the two indicated paths. The graphics.com command is a DOS command which is used to specify the IBM personal graphics or compatible printer. It must be available from the AUTOEXEC.BAT file.

### 2.5 Disk Space Requirements

SNAP-PC executables and help screen information require approximately 941K bytes of disk space. The executables require the bulk of that space at 877K bytes. If you load the files associated with adding user code, it will require an additional 400K bytes of disk space. It is recommended that after you create the new SNAP-PC simulation executable that you remove these additional files.

For each run that is made with SNAP-PC, a summary file is created and is stored on the disk until deleted. This file's disk space requirement is dependent on the size of the model and the amount of statistics requested. It will normally range between 9K and 30K bytes. To limit the size of these files, make sure the echo check switch on the general run information statement is set to (N) one.

#### 2.6 Adding Your Own User Code to SNAP-PC

If you are unable to model your facility using the SNAP-PC node symbology, you may write your own code to perform the desired logic. The function UF, which is contained in file UF.FOR, is supplied to interface between the task node INVL field and the user code. Before attempting to write your code, you should read pages 152-161 in the SNAP User's Manual. This section describes how the Function UF should be formatted and the support routines which may be called from your code.

Before you can write your user code, you must first load the required files from diskette two into the subdirectory SNAP\\_SRC\SNAP\_SRC. Follow the commands in Table 2.3.7 to perform this task.

Function UF must be written in FORTRAN and compiled using the Microsoft TM compiler version 3.3. Once compiled you must create a new SNAP-PC simulation executable by linking the simulation object code and the new UF object file. This is simply done by using the Microsoft link command, the response file RESPl, and the Microsoft libraries FORTRAN.LIB and MATH.LIB. (It is extremely important that you use the 8087 version of the MATH.LIB.) To link you must type the following replacing 'path' with the actual path name to where your Microsoft files are stored:

Table 2.6.1: Creating a New SNAP Executable

'path'\LINK, @RESP1, SNAPEXEC/E, , 'path'\FORTRAN+'path'\MATH /SE:600

Note: MATH.LIB must contain the 8087 library of Microsoft V3.3.

If the link completes successfully, the file SNAPEXEC.EXE will be created in the subdirectory. Before executing SNAP-PC you must move SNAPEXEC.EXE over to the subdirectory SNAP\\_SRC. This is done with the DOS copy command.

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Table 2.6.2: Moving Your New SNAP Executable

COPY SNAPEXEC.EXE C:\SNAP\\_SRC\SNAPEXEC.EXE ERASE SNAPEXEC.EXE

When you copy the executable over to the subdirectory \SNAP\\_SRC, it will replace the executable which already exists. Once you have the model running you may want to remove the SNAP object files from the PC to free the disk space.



#### 3.0 GETTING STARTED

The SNAP-PC Userl Support Program is designed to be a user-friendly interactive model development aid. To begin a session, enter [USER1] on your terminal. The first screen displayed is shown in Figure 3.0.1 and allows you to organize your models into working spaces. A working space is a storage area containing all of the necessary components or submodels of a model.

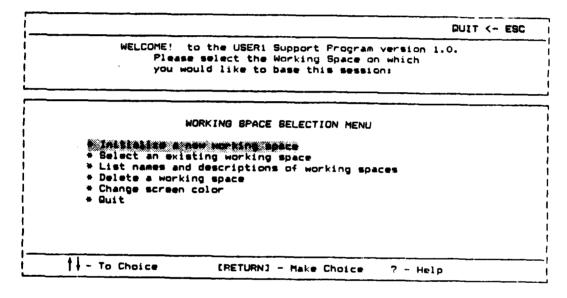


Figure 3.0.1: Working Space Menu

GUIT <- ESC

#### USER 1 PROGRAM HELP

The Useri Support Program is a menu driven program that assists the Type 1 User in developing models for analysis by a Type 2 User.

Each model is developed within a working space. A working space can contain only one Facility submodel and one Control submodel. Several Adversary Detection, Guard or Adversary submodels can be associated with the Facility submodel and the Control submodel and hence developed with one working space.

The user can move about a list of options on the screen by hitting one of the arrow keys; selection is made by hitting the return key on the console. This menu can be called up at any time by typing a question mark and then hitting return, (i.e., ? [RETURN]).

[RETURN] - To Continue

. . . MORE

QUIT <- EBC

Hitting the escape key will take the user to the menu annotated on the top right corner of the screen. This is usually the menu immediately prior to the current screen. This is a fast way to exit or recover from a mistake.

[RETURN] - To Continue

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Figure 3.0.la: Working Space Help



# 3.1 Initialize a New Working Space

Before you can begin building your model, you must first initialize a working space for that model.

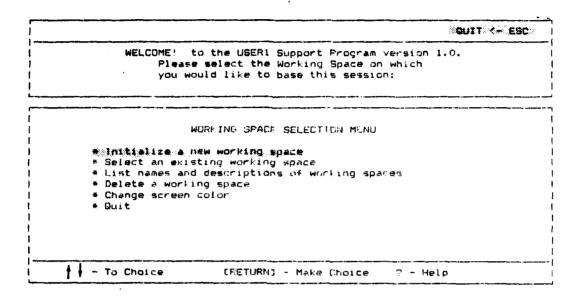


Figure 3.1.1: Working Space Menu (Initialize a new working space)



After you have chosen to initialize a model working space, you must supply a name and description for the working space.

WORKING SPACE: CREATE	main <- esc
WORKING SPACE NAME MENU	
Enter a name for this working spaces or type QUIT to leave this menu	
[RETURN] - To Continue	

Figure 3.1.2: Working Space Name

EXAMPLE

Figure 3.1.3: Working Space Description



After supplying a name and description for the new working space, you are given the option to copy an existing model into your new working space. With this option you can replicate whole or parts of models without the need to recreate them.

WORKING SPACE: CREATE	MAIN <- ESC
WORKING SPACE NAME MENU	
Enter a line of description for the working space:	_EXAMPLE
SNAP model given in the SNAP User's Manual, Chapter 1	ı x
Do you want to copy another working space? WEB or	NO
(RETURN) - To Continue	

Figure 3.1.4: Copying an Existing Working Space

# 3.2 Select an Existing Working Space

Before you begin building or editing an existing model, you must first enter the working space you initialized for the model. This is done by selecting the option, 'Select an existing working space'.

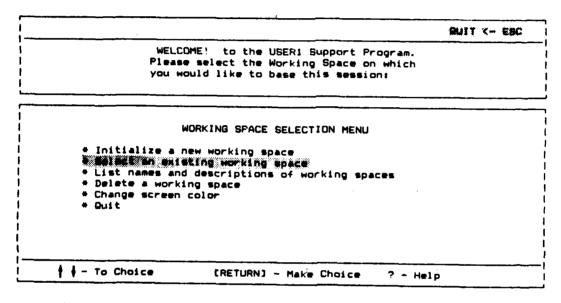


Figure 3.2.1 Working Space Menu (Select an existing working space)



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Use the arrow keys to move the highlighted block to the working space in which you would like to work and hit [RETURN].

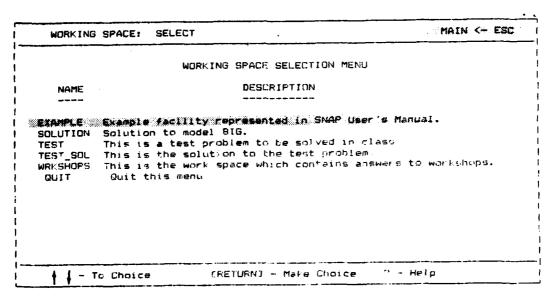


Figure 3.2.2: Working Space Selection Menu

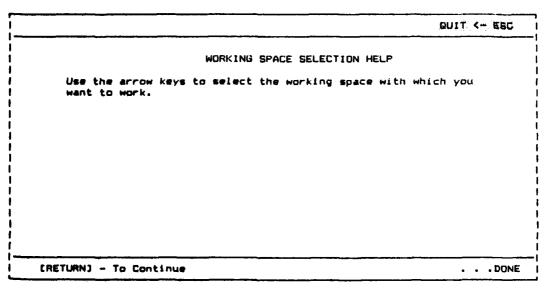


Figure 3.2.2a: Working Space Selection Help

After you have chosen a working space you must select the submodel with which you would like to work. The construction of each submodel is covered in detail in the Sections 4.0 through 7.0.

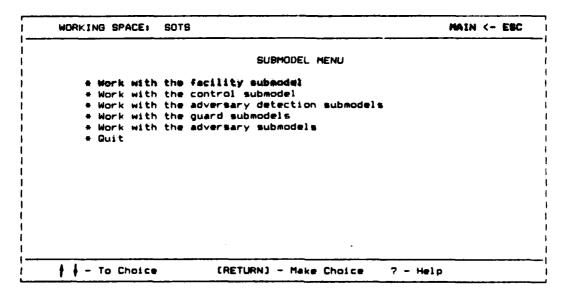


Figure 3.2.3: Submodel Menu

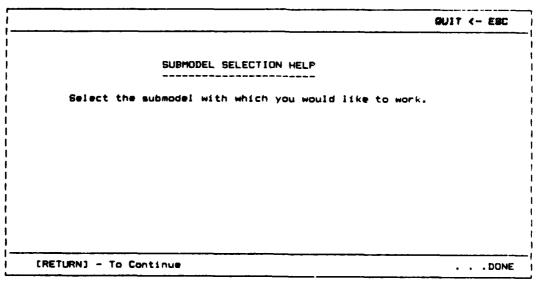


Figure 3.2.3a: Submodel Help

# 3.3 List Names and Descriptions of Working Spaces

You may review a list of the working spaces that have been initialized.

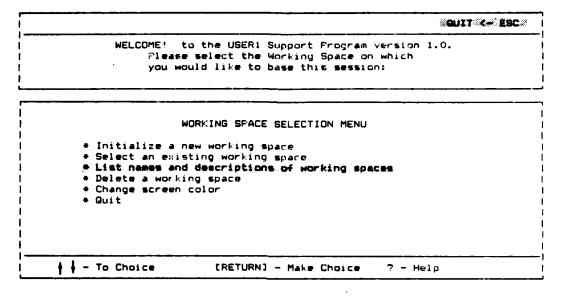


Figure 3.3.1: Working Space Menu (List names and descriptions of working spaces)

WORKING	SPACE: LISTING	3	MAIN <- ESC
	WC	DRKING SPACE DESCRIE	PTIONS
NAME		DESCRIPTION	
SOLUTION TEST_SOL	Solution to mode This is a test p This is the solu	problem to be solved ution to the test of	d in class
( DETI ION 1	- To Continue		DON

Figure 3.3.2: Working Space List - Sample

# 3.4 Delete a Working Space



To delete a working space, select the option 'Delete a working space'.

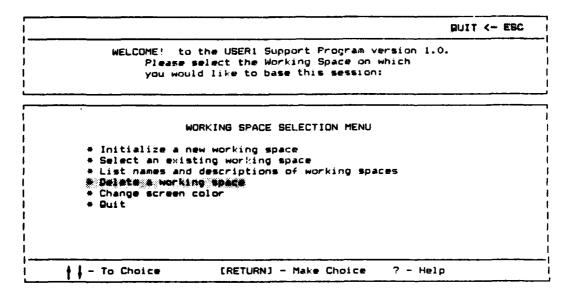


Figure 3.4.1: Working Space Menu (Delete a working space)



Select the working space that you want to delete from the list. You will be asked to verify your choice before the working space and its associated model is deleted.

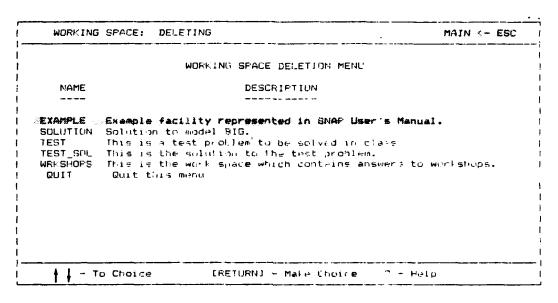


Figure 3.4.2: Working Space Deletion Menu - Sample

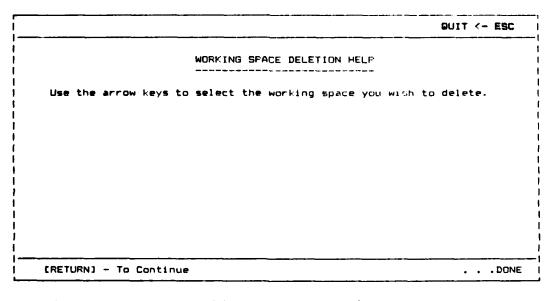


Figure 3.4.2a: Working Space Deletion Help

#### 3.5 Change Screen Color



From this menu you may also change the color combinations that are displayed on your video screen.

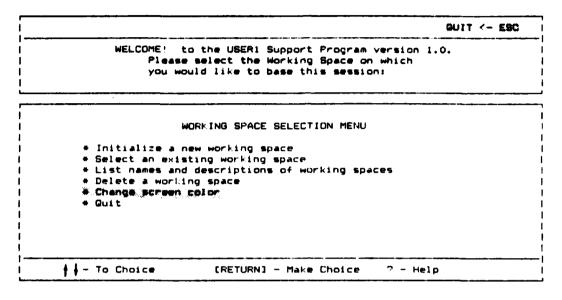


Figure 3.5.1: Working Space Menu (Change Screen Color)

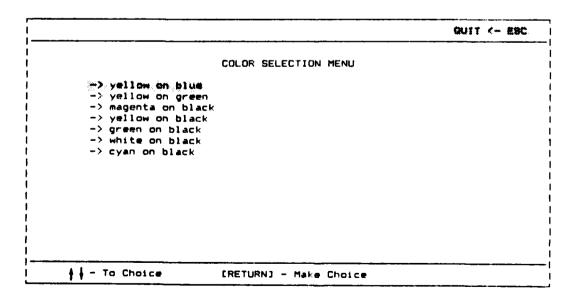


Figure 3.5.2: Screen Color Selection Menu



#### 3.6 Quit

You may exit the Userl support program by selecting the 'Quit' option or by typing [ESC].

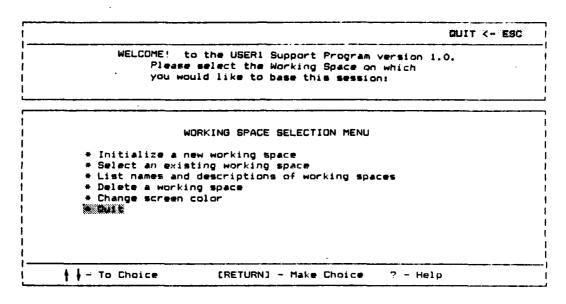


Figure 3.6.1: Working Space Menu (Quit)

#### 4.0 WORKING WITH THE FACILITY SUBMODEL

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The Facility Submodel is a representation of the facility or site under investigation. The submodel uses SPACES, BARRIERS, and TARGETS to represent the site. Spaces describe the areas that are open and may be traversed freely. Barriers represent obstacles that adversary forces must penetrate to gain access. Targets are locations that adversaries must reach to satisfy their objective. Spaces, barriers, or targets may contain a sensor which detects the presence of adversaries.

The facility submodel is a direct translation of your site's schematic. Its goal is to represent the attributes of your facility to the required level of detail while keeping the use of the computer and analyst resources to a minimum. The level of detail is determined by how many spaces are specified. The more spaces you include, the higher the level of detail you obtain. The number of spaces you specify has a direct impact on the size of your guard and adversary submodels as you must describe how your forces move through each space.

The remainder of this section discusses how you can build and edit a representation of your facility using the Userl Support Program. For more information on the facility submodel you may reference the SNAP User's Manual pages 4 and 15-26.

It is suggested that you complete the facility submodel before attempting to build the guard or adversary submodel since these refer to the facility submodel.



To work with the facility submodel choose the 'Work with the facility submodel' option from the 'SUBMODEL MENU'.

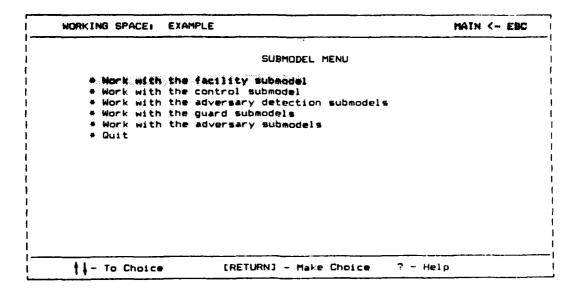


Figure 4.0.1: Submodel Menu (Work with the facility submodel)

# 4.1 Create/Edit the Facility Submodel

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To create or edit a facility submodel select the 'Create/Edit the facility submodel' option.

WORKING SPACE: EXAMPLE	MAIN <- ESC
FACILITY MENU	
* Create/Edit the facility submodel  * Generate SNAP input statments for the submodel  * Quit	
To Choice [RETURN] - Make Choice 2 - He	elp

Figure 4.1.1: Facility Menu (Create/Edit the facility submodel)

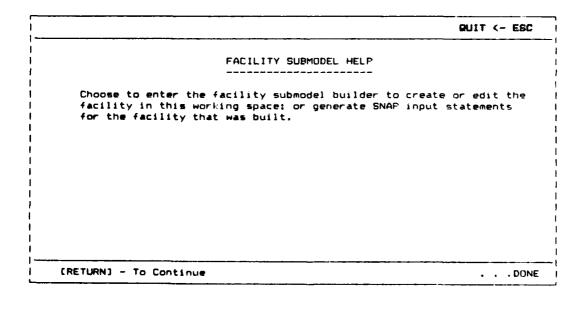


Figure 4.1.la: Facility Menu Help

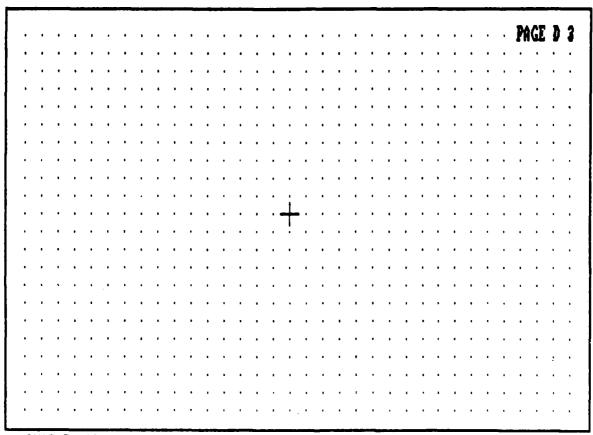
The first screen of the network builder will appear containing a grid and command line. The grid represents the pages available in which the facility may be drawn. These pages are identified using the letters and numbers labelling the grid. For example, the cursor is pointing to page D,3 in Figure 4.1.2. The character, '\*' will mark the pages which already contain facility information. You are not restricted to fitting the facility onto one page. To select a page with which to work, move the cursor to the desired page (using the arrow keys) and type [ENTER].

	1	2	3	4	5	6
A						
B						
C						
D			+			
E						
F						
G						
H						

Facility Page Selection: ARROWS to move, [ENTER] to select, X to exit.

Figure 4.1.2: Facility Page Selection Screen

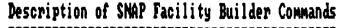
The contents of the page you selected will appear on the screen along with the page id in the uppermost right corner and a list of available commands along the bottom. A detailed description of the commands is listed in Figure 4.1.3a and is available, on-line, by typing [?].



SNAP Facility Builder Commands: ARROWS, C, S, B, T, L, A, D, M, E, P, O, Q, ?(help)

Figure 4.1.3: Facility Builder Page





ARROUS Move the crosshair in the appropriate direction. C)rosshair Toggle the crosshair speed between fast and slow. Enter a space node at the current crosshair location. S)pace Enter a barrier node at the current crosshair location. B)arrier Enter a target node at the current crosshair location. I)arget L) ine Enter the line drawing mode. A)nnotate Enter text at the current crosshair location. Delete the node, text or line under the current crosshair D)elete location. (Confirmation will be requested). M) ove Enter the move mode for the node or text under the current crosshair location.

E) dit Edit the labels of the node under the current crosshair

location.

P)rint Generate a hardcopy of the current facility page on the printer.

O)ptions Select current display options.

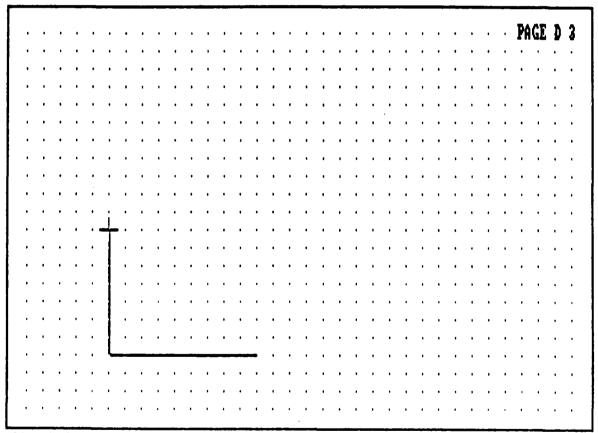
Q)uit Exit from the SNAP facility builder.

The ESC key may be used to cancel any command in progress.

Press any key to continue.

Figure 4.1.3a: Facility Builder Commands Help

Using the facility builder (L)ine command you can draw a representation of your facility on the screen. To draw a line place the cursor at the point you wish the line to begin and type [L]. Then move the cursor (by using the arrow keys) in the direction you wish the line to be drawn on the screen. To make a bend point in the line, type [SPACE] at the point you wish the bend to be and continue moving the cursor. To end the line and exit the line mode, type [ENTER].



Line Mode Commands: ARROWS, C, SPACE, ENTER, ESC, ?(help)

Figure 4.1.4: Line Mode

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Move the crosshair in the appropriate direction and update the "rubber band" line from the current origin point to the crosshair location. (The initial origin point is the current crosshair location at the time the line mode is initiated, but it may be updated by the SPACE command. See below.)

C)rosshair Toggle the crosshair speed between fast and slow.

SPACE

Make the current "rubber band" line permanent, and then begin entry of a new line with its origin at the current

crosshair location.

ENTER Make the current "rubber band" line permanent, and then return to the main command menu.

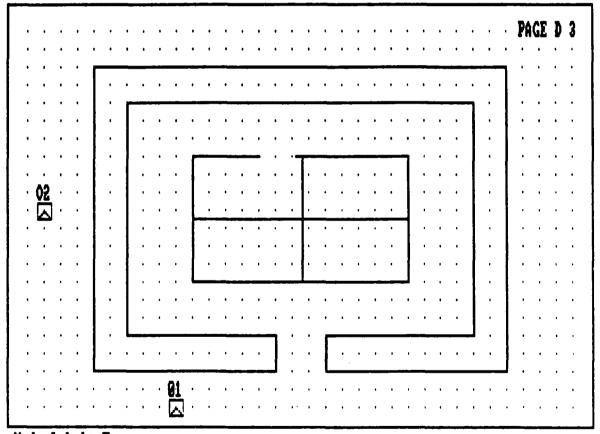
ESC Abort entry of the current line and return to the main

command menu.

Press any key to continue.

Figure 4.1.4a: Line Mode Help

Once you have sketched the outline of your facility, you may section it into areas and define them as spaces, barriers, or targets. To define the areas on the diagram you place the appropriate facility node in the sectioned area. By typing [S], [B], or [T], you may place space, barriers, or targets onto the diagram. When you add a node, you will be asked to supply a node label, a sensor label if one exists, and a specification for node statistics (Yes or No). Node labels can be up to four characters long.

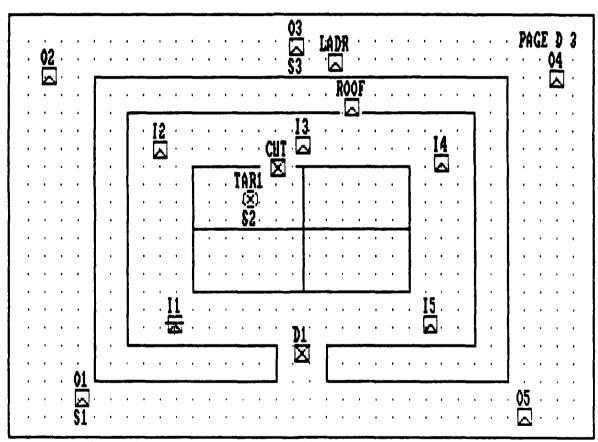


Node Label:

Figure 4.1.5: Node Placement



If you wish to change the information associated with a node (i.e., node statistics), you may do so by using the edit command. By placing the cursor on the node you wish to edit and typing [E], you may change any of its information. You may move the location of a node around the current page by placing the cursor on the node and typing [M]. You can then move the node around the page using the arrow keys. Typing [ENTER] will place the node at its new location or an [ESC] will redraw it back at its original location.



Move Mode Commands: ARROWS, C, ENTER, ESC, ?(help)

Figure 4.1.6: Move Mode



# Description of Move Mode Commands

ARROHS Move the crosshair and associated node or text in the appropriate direction.

C)rosshair Toggle the crosshair speed between fast and slow.

ENTER Complete the move command by fixing the location of the node or text associated with the crosshair at its current location. End move mode and return to the main command menu.

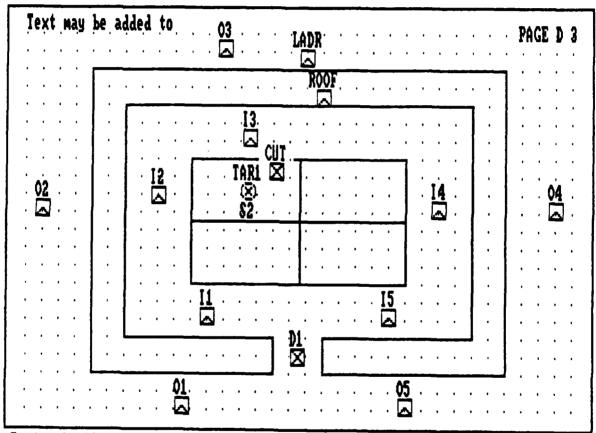
Abort the current move command and return the node or text associated with the crosshair to its position prior to the start of the move command. End move mode and return to the main command menu.

Press any key to continue.

Figure 4.1.6a: Move Mode Help



To add clarity to a diagram, you may add text to a page by using the annotation command. Place the cursor at the location you want the text string to begin and type [A]. Type the text in the space provided, up to one line at a time, and hit return to display the text on the diagram. You may edit the text using the backspace key while typing it. Once you have hit the return key you may delete the string and then re-enter it if you wish.

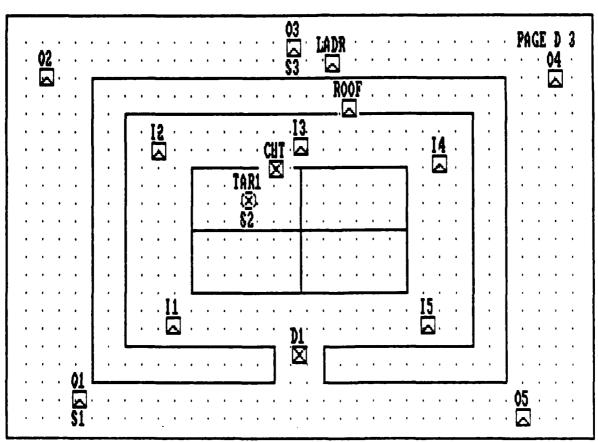


Text: clarify a point.

Figure 4.1.7: Adding A Textual Description

To delete any node, line, or annotation from the screen, place the cursor on the item you wish to delete and type [D]. The item you selected will flash and you will be requsted to verify your selection. To obtain a paper copy of the current page, you may use the print command, [P]. It sends a copy of the page to any EPSON-compatible parallel printer.

You may change how your screen is displayed by selecting the display option [O]. From here you may toggle the display of the grid, nodes, node labels, and annotation on and off. You also have the option to review the status of your submodel.



Display Options: G, A, N, L, S, ?(help)

Figure 4.1.8: Display Mode



# Description of Display Option Commands

G)rid

Toggle the grid display on or off.

A)nnotation Toggle the display of annotation on or off.

N) ode

Toggle the display of SNAP nodes on or off.

L)abel

Toggle the display of SNAP node labels on or off.

\$) tatus

Display a report on the status of the display options, status of the current display page and status of the overall facility.

All display option commands return to the main command menu upon completion.

Press any key to continue.

Figure 4.1.8a: Display Help



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The status of the facility submodel is sectioned into three parts; the display status, showing how each display toggle is set; the page status, which shows the page id and the number of lines, nodes and annotations on that page; and the overall facility status, which gives you the number of lines, nodes and annotations in the whole facility, along with the available memory space left for construction. When you begin work with a new facility submodel, there are 65000 bytes of memory free. Each line, node, and annotation you add requires a portion of that memory and reduces the amount available. So there is an upper limit to the size of the facility that may be defined. However, it is very large and should never be a limiting factor.

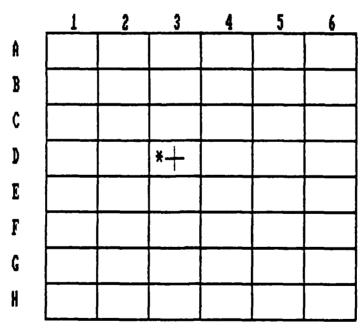
Facility: C:\SNAP\USER1\SCRATCH

Facility Status	Page Status	Display Status
19 Lines	Page No. D, 3	Grid: ON
15 Nodes	19 Lines	Annotation: ON
2 Annotations	15 Nodes	Nodes: ON
57022 Bytes Free	2 Annotations	Node Labels: ON

Press any key to continue.

Figure 4.1.9: Status Screen

Once you have completed working with a page, you may exit it by typing [Q]. If you have entered information on an empty page, you will notice that a star '\*' has been added to the Facility Page Selection Screen. You may continue constructing the facility submodel by choosing another page with which to work, or if you are done, you may exit the facility submodel builder by typing [X]. When you type [X], you will be asked whether you want to save the changes. By typing [Y], the changes are saved. By typing [N], the changes are not saved and your facility returns to its status prior to this editing session. In either case you will return to the 'FACILITY MENU'. Typing any other key at this point will cancel the exit option and return you to the page selection screen.



Facility Page Selection: ARROWS to move, [ENTER] to select, X to exit.

Figure 4.1.10: Page Selection Menu After Entering Information

#### 4.2 Generate SNAP Input Statements



After you have created your facility submodel, you may generate the SNAP input statements for the submodel. From the 'FACILITY MENU' choose the option 'Generate SNAP input statements for the submodel'. The program will then convert your facility diagram into SNAP statements and write them to a file (FACILITY.NET). This file will be in your working space subdirectory. It contains the input data read by SNAP and must be regenerated after every change to the graphical facility submodel.

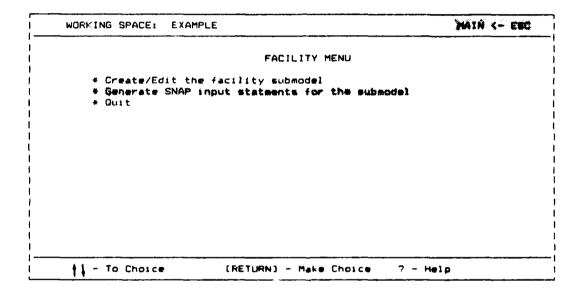


Figure 4.2.1: Facility Menu (Generate SNAP input statements for the submodel)



# 4.3 Quit

To exit the facility submodel section, select the 'Quit' option.

WORKING SPACE: EXAMPLE	HAIN CH ESC
FACILITY MENU	
<pre># Create/Edit the facility submodel # Generate SNAP input statments for the submodel # Quit</pre>	
- To Choice [RETURN] - Make Choice ? - H	elp

Figure 4.3.1: Facility Menu (Quit)

### 5.0 WORKING WITH THE CONTROL SUBMODEL



WORKING SPACE:	EXAMPLE	MAIN (~ KE
	SUBMODEL MENU	
• Work with	the facility submodel	
4 Mork with	the central submodel	
	the adversary detection submodels	
• Work with	the guard submodels	
	the adversary submodels	
• Ouit		
1 - To Choice	(RETURN) - Male Choice	~ - Helo

Figure 5.0.1: Submodel Menu

The control submodel consists of the general run information, the parameter statements and all of the status variable statements. Since this submodel contains data intrinsic to the other submodels, you are permitted to build only one to avoid confusion. It can be parameterized to permit User2 to alter global variables.

#### 5.1 Create/Edit the Control Submodel

After you have chosen to work with the control submodel, you have two options. You may create or edit the control submodel or you may generate the SNAP input statements.

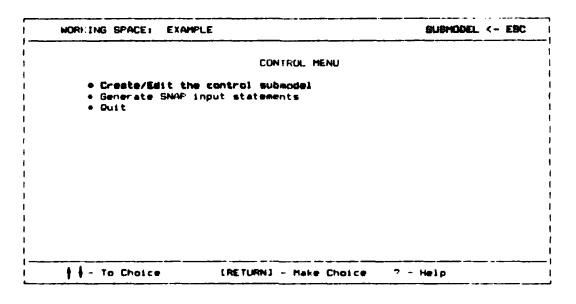


Figure 5.1.1: Control Submodel Menu (Create/Edit the control submodel)

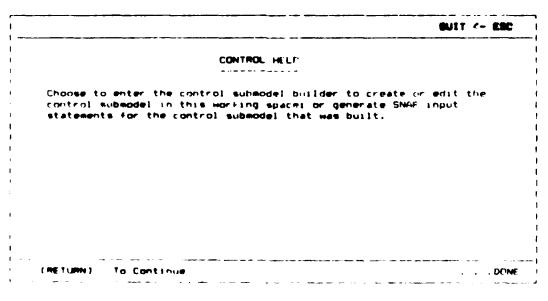


Figure 5.1.1a: Control Submodel Help

Since you cannot generate SNAP input statements until you build the control submodel, you must select the create/edit option first. When you select this option, a menu containing the seven types of control statements will appear. From here you may select the type of statement you wish to create.

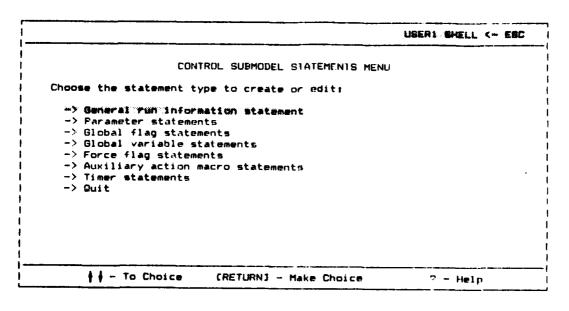


Figure 5.1.2: Control Submodel Statements Menu

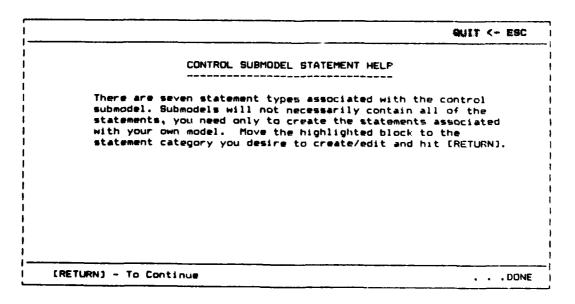


Figure 5.1.2a: Control Submodel Statements Menu Help



#### 5.1.1 General Run Information Statement

The first statement on the menu contains general run information. It is the only statement that is required in the control submodel.

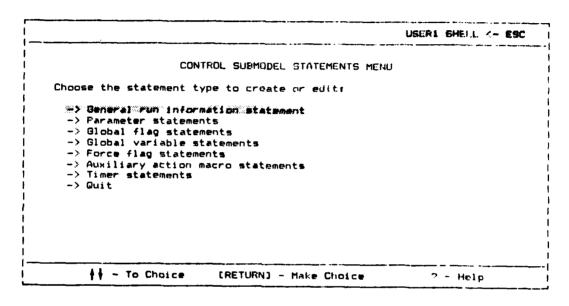


Figure 5.1.1.1: Control Submodel Statements Menu (General run information statement)

When you originally select to create it, a data input menu will be displayed containing the statement defaults. For an explanation of each field, refer to the copy of the help screens in Figure 5.1.1.2a. If you need further explanation, you may reference the SNAP User's Manual, pages 93-95.

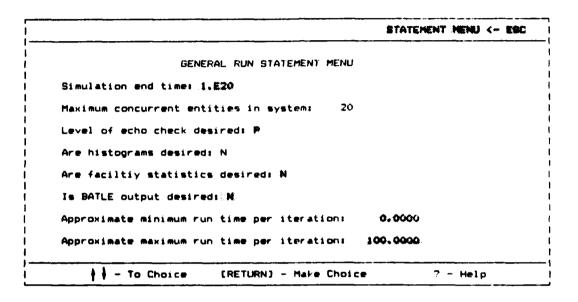


Figure 5.1.1.2: General Run Statement Menu



		QUIT <- EBC
GENERAL	L RUN STATEMENT HELP	
Definition	Options	Default
Simulation end time	real	1.E20
BNAP storage requirement	integer	20
Echo flag	C-complete, P-partial N-none	F
Histogram print flag	Y-yes, N-no	N
Facility statistics option	C-complete, P-partial N-none	N
(RETURN) - To Continue		MORE

		QUIT (- ESC
BATLE output option	Y-yes, N-no	. N
Minimum expected run time per simulation iteration (in minutes)	real	0.0
Maximum expected run time per simulation iteration (in minutes)	real	100,0
<pre>exx - where xx is a number;</pre>	may be entered in most f	elds to note
parameters		
•	s made to this menu scre	en during this
ESC - will cancel any change	s made to this menu scre	en during this
ESC - will cancel any change	s made to this menu scre	en during this

Figure 5.1.1.2a: General Run Information Help

#### 5.1.2 Parameter Statements

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Parameter statements are used to define statistical distributions that are used by the model.

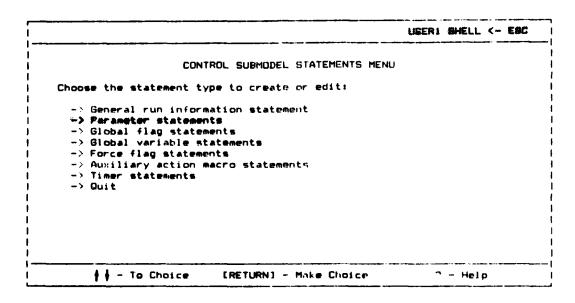


Figure 5.1.2.1: Control Submodel Statements Menu (Parameter statements)

When you select to create a parameter statement, a listing menu will be displayed giving you the option to add statements.

The global flag, global variable, force flag, and timer statements will also have a similar listing menu associated with them.

PARAMETER STATEMENT LISTING STATEMENT MENU <- ESC							ESC	
O.	FARAM SE1 NO.	PARAM UNE BAVE	PARAM 1WU	FARAM THREE	FARM FUUR	i di serine saline		
					RET) - EDIT		- Help	

Figure 5.1.2.2: Parameter Statement List

		QUIT	<-	EBC:
	STATEMENT SELECT HELP			
Δ	rrows - move up or down the list one item at a time.			
F-	gUp - move up the list a page at a time.			
P	gDn - move down the list a page at a time.			
Н	lome $\sim$ move to the top of the list.			
ŧ	nd — move to the buttom of the list.			
A	Add a statement to list above current line.			
D	- Dolete statement currently selected.			
R	ETURN - Edit statement corrently solution.			
CRETU				DOME

Figure 5.1.2.2a: Parameter Statement List Help

By typing [A] a data input menu for the parameter statement will appear. This menu allows you to enter the data for a single parameter statement. For an explanation of each field a copy of the help screens is given following the statement menu figure.

If you need further explanation, you can reference the SNAP User's Manual, pages 12-14 and 74-75.

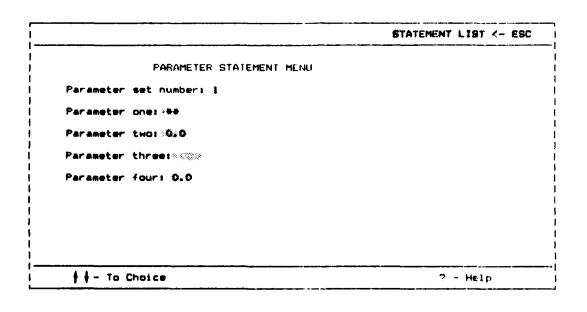


Figure 5.1.2.3: Parameter Statement Menu



			QUIT (- ESC
	P/	ARAMETER SET HELP	
	Definition	Options	Default
Paramete	r set number	integer 1 to 100	1
1st para	meter	real	* *
2nd para	meter	real	0.0
3rd para	meter	real	1.620
4th para	meter	real	0.0

	QUIT <- E80
€нн	<ul> <li>where xx is a number, may be entered in most fields to note parameters</li> </ul>
**	- denotes fields which cannot be defaulted
ESC	<ul> <li>will cancel any changes made to this menu screen during this session</li> </ul>
	JRN1 - To Continue DON

Figure 5.1.2.3a: Parameter Statement Help

Once you have entered all the data for the statement, you can save it by typing the return key while in the last data field. This will redisplay the statement listing menu. You can continually add more statements to the list by typing [A]. In addition, you may delete [D], edit (type [RETURN]) a statement, or save the data you have entered. The help screen shown in Figure 5.1.2.2a explains the options you have on the listing menu.

#### 5.1.3 Global Flag Statements

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Global flags are used to allow you to control portions of the model by the status of a flag. This statement allows you to define and initialize global flags.

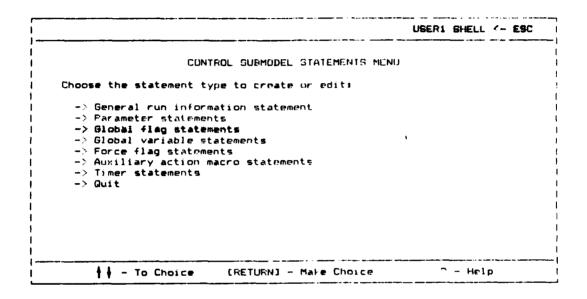


Figure 5.1.3.1: Control Submodel Statements Menu (Global flag statements)

The following figure shows the data input menu for the global flag statement. This menu is accessed in the same manner as the parameter statement, discussed in Section 5.1.2.

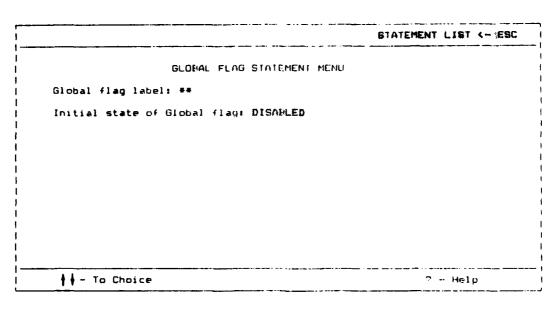


Figure 5.1.3.2: Global Flag Statement Menu

		QUIT <- ESC
<del></del>	GLOBAL FLAG HELF	
Definition	Options	De(ault
Flag label	4 characters max	••
Initial flag state	ACTIVE, DISABELD	DISABLED
@xx - where xx is a numbe parameters	er, may be entered in most field	is to note
	th cannot be defaulted	
ESC - will cancel any cha session	inges made to this menu screen (	during this
[RETURN] - To Continue		DON

Figure 5.1.3.2a: Global Flag Statement Help

### 5.1.4 Global Variable Statements

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The global variable, much like the global flag, can be used throughout the model to control or effect force actions. The global variable statement defines and initializes the global variables.

		USERI	SHELL <	- ESC
	CONTROL SURMODEL STATEMENTS MENU			
Choos	e the statement type to create or edit:			
-	General run information statement			
->	Farameter statements			
<b>~</b> .	Global flag statements			
->	Slobal variable statements			
- `	Force flag statements			
- >	Auxiliany action macro statements			
	Timer statements			
- >	Quit t			
	1 - To Choice [RETURN] - Male Choice		- Help	

Figure 5.1.4.1: Control Submodel Statements Menu (Global variable statement)

The Global Variable Statement Menu is accessed in the same manner as the parameter statement, discussed in Section 5.1.2.

STATEMENT LIST <- ESC

n in the line of t

GLOBAL VARIABLE STATEMENT MENU

45 tiobal variable labels 44

of the value of Global variable: 0,00

- 1 1 to

## 5.1.5 Force Flag Statements

The force flag serves as an attribute of a force and can be used to control action in the model. This statement supports the definition and initialization of force flags.

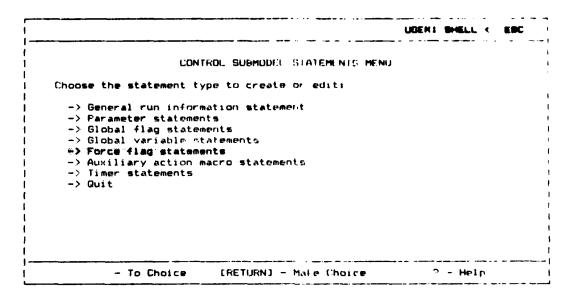


Figure 5.1.5.1: Control Submodel Statements Menu (Force flag menu)



The 'PORCE PLAG STATEMENT MENU' is accessed in the same manner as the parameter statement, discussed in Section 5.1.2.

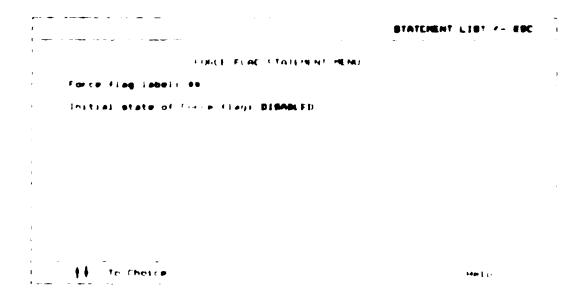


Figure 5.1.5.2: Force Plag Statement Menu

F( -	ORCE FLAG HELP	
Definition	Options	Default
Force Flag label	4 characters max.	••
Initial state for each force	ACTIVE, DISABLED	DISABLE
Фих - where их is a number, m	ay be entered in most fiel	ds to note
- denotes fields which can		
ESC - will cancel any changes session	made to this menu screen	during this

Figure 5.1.5.2a: Force Flag Statement Help

## 5.1.6 Auxiliary Action Macro Statements



The macro statement is used to set several variables or flags at a specific point in time in the simulation.

	UBER1	SHELL 4- ES	ac
CONTROL SUBMODEL STATEMENTS MENU	J		
Choose the statement type to create or edits			
-: General run information statement			
- Ferameter statements			
-> Global flag statements			
- Ginbal variable statements			
- Force flag statements			
-> Audiliary action macro statements			
+ Timer statements			
+> Ourt			
↑ - To Choice [RETURN] - Hale Choice		- He) p	

Figure 5.1.6.1: Control Submodel Statements Menu (Auxiliary action macro statement)



When creating a macro statement, you must first supply the name of the new macro. This is done by selecting the create option on the macro name menu.

MACRO N	AMES				STATEMENT	MENU <- ESC
CHOOSE	THE MACRO	TO EDIT	OR CREATE	A NEW MACRO:		
CREATE	QUIT					
11	- To Chai	c <b>e</b> (	RETURN) ~	Make Choice	2 -	- Help

Figure 5.1.6.2: Macro Name Menu

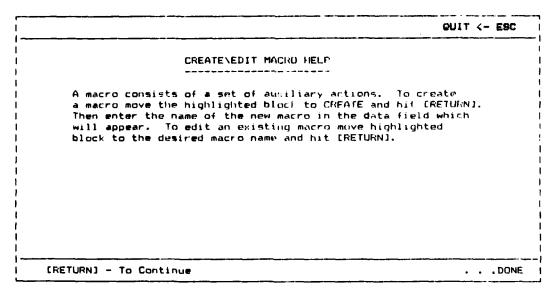


Figure 5.1.6.2a: Create/Edit Macro Help



Enter the new macro name in the input field that appears on your screen.

MACRO N	AMES	STATEMENT MENU - ESC
CHOOSE	THE MACRO TO EDIT OR CE ATE A NEW	MACKO:
CREATE	QUIT	
Enter	the name for the now marros	
+	- To Chaice (RETURN) - Make Li	norman e e e e e e e e e e e e e e e e e e e

Figure 5.1.6.3: Entering New Macro Name

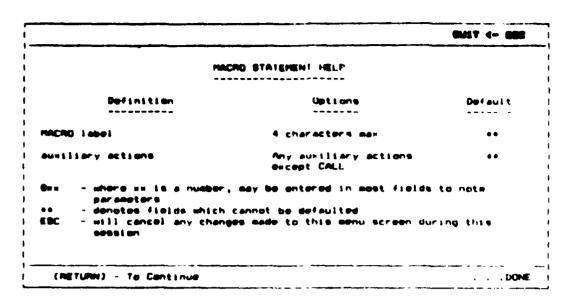


After entering the name, a listing menu like that of the parameter statement will appear. From here you can enter all of the auxiliary actions associated with the macro in the same manner as described for the parameter statement. If additional help is needed concerning the macro statements, you can reference the SNAP User's Manual, pages 76-77. After you have added all the auxiliary actions, you can save the entire list by choosing the save option on the listing menu.

	STATEMENT LIST	FAC
	MALIGU STAFFMENT METH	
l	Auriliary action: 00	
1	Au i.iar, action labels se	
	If an illumy actions is SET enter value of a risk of the property	
 		1
		1
		r
	# - To Choice	1

Figure 5.1.6.4: Macro Statement Menu

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Pigure 5.1.6.4a: Macro Help



#### 5.1.7 Timer Statements

Timers are used to support statistics collection of the length of time it takes to perform a series of actions. This statement supports the definition of timers.

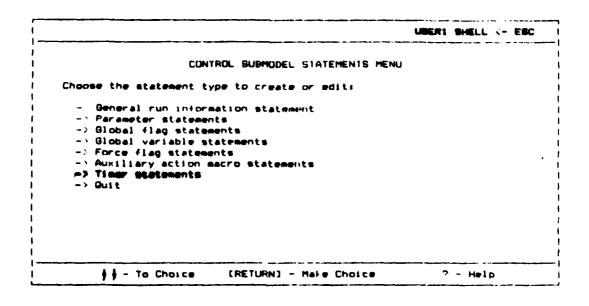


Figure 5.1.7.1: Control Submodel Statements Menu (Time statement)

The 'TIMER STATEMENT MENU' is accessed in the same manner as the parameter statement, discussed in Section 5.1.2.



	a anggan ann an ann an an an an an an an an an	STATEMENT LIST <- ESC
	TIMER STATEMENT MENU	
Timer label: ##		
Timer type: TSM		
Timer identifier:		
† + To Choice		~ - Help

Figure 5.1.7.2: Timer Statement Menu



		BUIT <* ESC
	TIMER CARD HELP	
Definition	,Uptions	Default
FIMER label	4 characters max	**
TIMER type	TER - Time Between Rosords TEM - time Since Marked THC - Time of First RLCORD	TSM
TIMER identifier	20 character name for cultput	bl ank
CRETIANT - To Continue		MORE

	QUIT <→ EBC
•ин	- where xx is a number, may be entered in most fields to note
	parameters
**	- denotes fields which cannot be defaulted
ESC	<ul> <li>will cancel any changes made to this menu screen during this session</li> </ul>
r Df	ETURN) - To Continue DON

Figure 5.1.7.2a: Timer Statement Help

### 5.1.8 Quit



You may exit the control submodel creating and editing session by selecting the 'Quit' option. After selecting 'Quit' you will be asked whether you wish to save the changes made to the submodel.

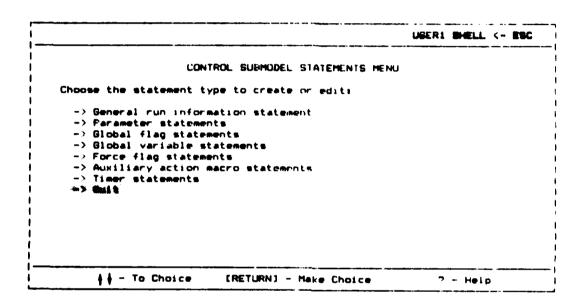


Figure 5.1.8.1: Control Submodel Statements Menu (Quit)



## 5.2 Generate SWAP Input Statements

Once you have created all of your control statements, you are ready to generate the control submodel input statements.

Simply select the 'Generate SNAP input statements' option of the 'CONTROL MENU' (Figure 5.1.1) to create the input statements file. The file that is generated (CONTROL.CSM) is located in your working space subdirectory. Like all of the submodel statement files, it is transparent to both Userl and User2.

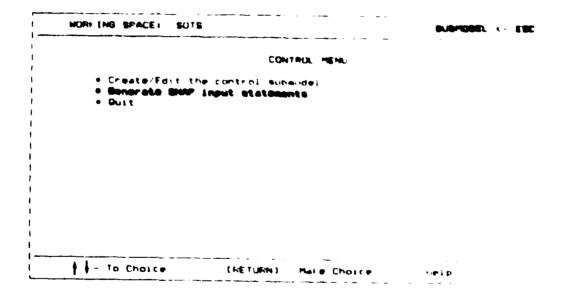


Figure 5.2.1: Control Submodel Menu (Generate SNAP input statements)

22210 SEESESSAN 21255

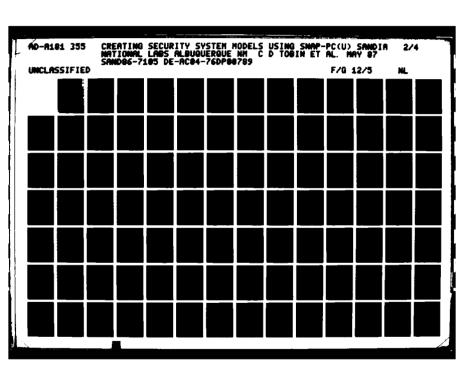
## 5.3 Quit

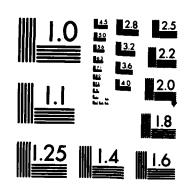


To exit the control submodel section, select the 'Quit' option.

MORY ING BEACE! EXAMPLE	SUBMODEL < E8
	CUNTROL MENU
<ul> <li>Create Edit the contri Generate SNAF input si Butt</li> </ul>	
1 To Choice [RE	TURN) - Make Choice ? - Help

Figure 5.3.1: Control Menu (Quit)





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

#### 6.0 WORKING WITH THE ADVERSARY DETECTION SUBMODEL

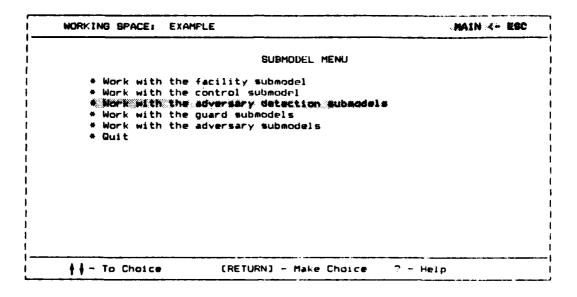


Figure 6.0.1: Submodel Menu

The adversary detection submodel describes what happens when a sensor detects the presence of an adversary. The Userl support program allows you to 'draw' the Adversary Detection Diagram and fill in pertinent information on a menu screen and then generate the SNAP input file. Using it, you can create multiple submodels and parameterize them for User2.

When you are ready to create an adversary detection submodel for a facility, choose the option 'Work with the adversary detection submodels' from the 'SUBMODEL MENU'.

The second second

## 6.1 Create an Adversary Detection Submodel

The 'ADVERSARY DETECTION MENU' will then be displayed giving you several options. An explanation of these options is shown in Figure 6.1.la. To create an adversary detection submodel, you must select the create option on the menu.

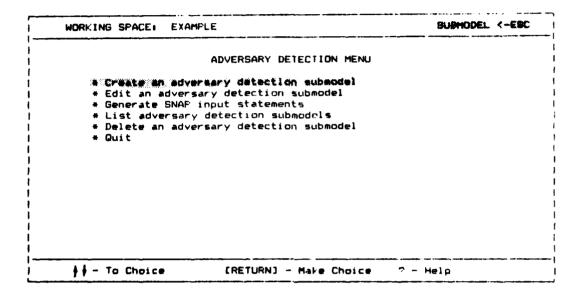


Figure 6.1.1: Adversary Detection Menu (Create an adversary detection submodel)

MULT <- ESC

### ADVERBARY DETECTION HELP

Choose to enter the network builder by creating or editing an adversary detection submodel. In addition, from this menu you may translate network symbols into SNAP input statements for a submodel, list or delete submodels.

[RETURN] - To Continue

. . . DONE

Figure 6.1.la: Adversary Detection Help



The first screen of the network builder will then appear containing a grid and a command line. The grid represents the 48 pages that can be used to construct the submodel. These pages are identified by the letters and numbers bordering the grid. For example, the cursor is in Page D,3 in Figure 6.1.2. The character '\*' will mark the pages which currently contain adversary detection submodel information. You can move the cursor around the grid by using the arrow keys and select the page in which you are interested by hitting the return, or enter, key.

	1	2	3	4	5	6
A						
B						
C						
D			+			
E						
F						
G						
H						

COMMANDS: ARROWS, [ENTER], (F) ind, (C) heck, e(X) it, (?) help

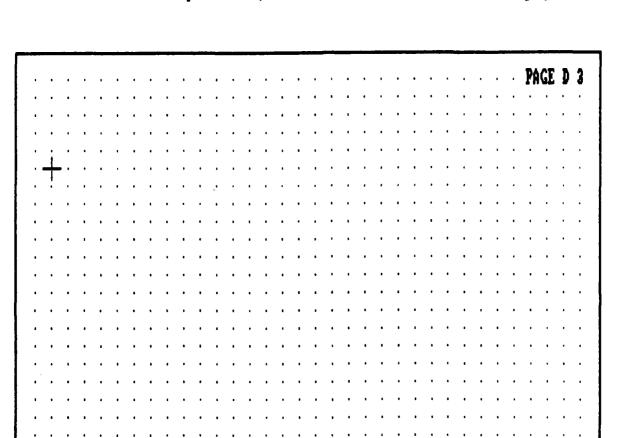
Figure 6.1.2: Adversary Detection Submodel Network Builder Selection Screen

	Description of Display Control Commands			
ARRONS	Move cursor from box to box on the screen. Each box is associated with a page on which the network may may be drawn.			
(ENTER)	Hitting ENTER selects the page associated with the box that the cursor is in.			
(F)ind	Search the network for a node entered from the terminal. The page on which the node occurs will be returned if it is found.			
(C)heck	Check if all nodes in the network have been filled. A list containing the label and location of the nodes that have not been filled will be shown on the screen.			
(H)elp	Prints this information to the screen.			
e(X)it	Causes the program to terminate.			

Press any key to continue.

Figure 6.1.2a: Adversary Detection Submodel Network Builder Page Selection Screen Help

Once you have selected the page with which you desire to work, the contents of that page will be displayed on the screen. The page id will appear in the uppermost right corner and a list of options along the bottom of the screen. The commands are described on the help screen, which is listed on the next page.



Commands: ARROWS, C, N, L, S, G, B, F, A, D, M, E, P, O, Q, ?(help)

Figure 6.1.3: Adversary Detection Network Builder Page

# Description of SNAP Adversary Detection Device Builder Commands

**ARRONS** Move the crosshair in the appropriate direction. C)rosshair Toggle the crosshair speed between fast and slow. Enter a GOTO node at the current crosshair location. G) a ta S)ensor Enter a SENSOR node at the current crosshair location. B) ranch Enter the branch drawing mode. Fill node menu at current crosshair location. F)ill Enter a LOGIC node at the current crosshair location. L)ogic Enter a MONITOR node at the current crosshair location. mo(N)itor D)elete Delete current item. (Confirmation will be requested). Move the node or text at the current crosshair location. M) ove Edit the node under the current crosshair location. Generate a hardcopy of the current facility page on the printer. E)dit P)rint Select current display options. Quit this page of the SNAP network builder. 0)ptions Q)uit

The ESC key may be used to cancel any command in progress.

Press any key to continue.

Figure 6.1.3a: Adversary Detection Network Builder Help

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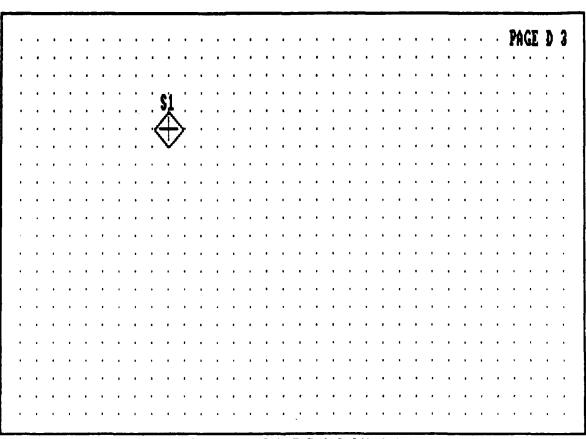
When a sensor detects the presence of an adversary, it transmits a signal to the guard force that is waiting for the signal. Along its transmission path, the signal may be interrupted at junction loops or switches. To prevent this, other sensors (tamper alarms) can be associated with any detection device. These tamper alarms will alarm if the detection device is disabled. The signal is also subject to logical confounding. In other words, the monitor may be able to tell that some detection device has alarmed, but cannot identify which.

These aspects of the adversary detection submodel are described graphically using the Adversary Detection Diagram.

SNAP-PC allows you to interactively 'draw' the diagram. (S)ensor nodes are represented using circles; (L)ogic points, the junction boxes or switches, are squares; and triangles are mo(N)itors. The transmission paths are represented by solid lines, (B)ranches, between the symbols, or nodes.

To add a node to the diagram, position the cursor to where you would like the node placed and then type the letter associated with the node. You will be asked to enter a node label (4 characters maximum). The node symbol and its label will then be displayed on your screen.

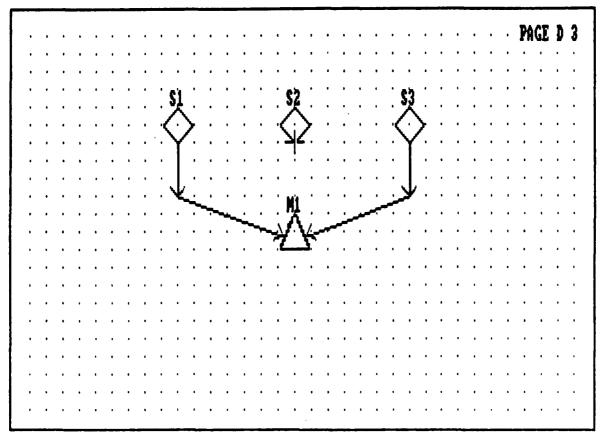




Commands: ARROWS, C, N, L, S, G, B, F, A, D, M, E, P, O, Q, ?(help)

Figure 6.1.4: Node Placement

To show the path a signal takes through a detection submodel, the nodes are connected by (B)ranches. A branch is created
by placing the cursor at the desired beginning point of the branch
and then typing (B). The branch is drawn as you move the cursor
around the page. A bend point in the branch can be drawn by
typing (SPACE) and continuing. To end the branch you type
[RETURN].



Branch Mode Commands: ARROWS, C, SPACE, ENTER, ESC, H(elp)

Figure 6.1.5: Branch Mode





# Description of Branch Mode Commands

ARROWS

Move the crosshair in the appropriate direction and update the "rubber band" branch from the current origin point to the crosshair location. (The initial origin point is the current crosshair location at the time the line mode is initiated, but it may be updated by the SPACE command. See below.)

C)rosshair Toggle the crosshair speed between fast and slow.

SPACE

Make the current "rubber band" branch permanent, and then begin entry of a new branch with its origin at the current

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crosshair location.

Make the current "rubber band" branch permanent, and then return to the main command menu. ENTER

**ESC** Abort entry of the current branch and return to the main

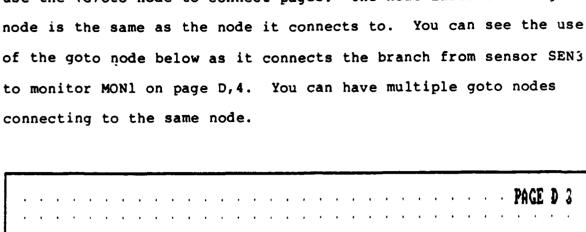
command menu.

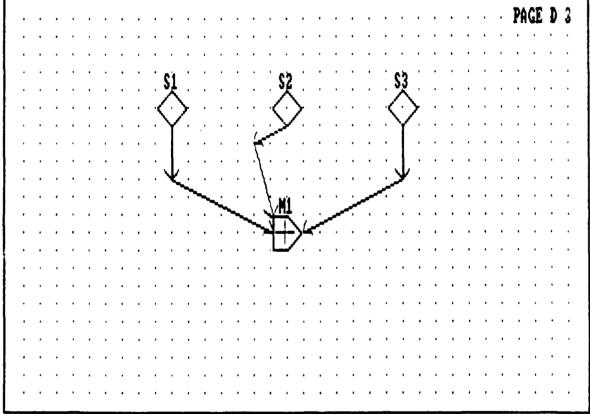
Press any key to continue.

Figure 6.1.5a: Branch Mode Help



When the submodel is too big to fit onto one page, you can use the (G)oto node to connect pages. The node label of the goto node is the same as the node it connects to. You can see the use of the goto node below as it connects the branch from sensor SEN3 to monitor MON1 on page D,4. You can have multiple goto nodes





Commands: ARROWS, C, N, L, S, G, B, F, A, D, M, E, P, O, Q, ?(help)

Figure 6.1.6: The Goto Node

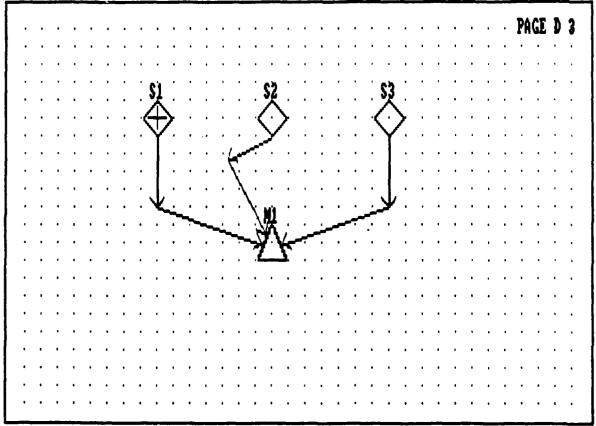
To add clarity to your diagram you may enter text by using the (A)nnotation command. It allows you to enter one line of text and place it at the current position of the cursor.

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•	•	•	•	•	•	•	•	•	•	•	٠	•	•	٠		1		•	•	•	•	•	•	•	٠	•	•	٠	•	•	•		
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Commands: ARROWS, C, N, L, S, G, B, F, A, D, M, E, P, O, Q, ?(help)

Figure 6.1.7: The Goto Node Continuation Page

Once the network is constructed, you will need to supply data for the sensor and monitor nodes. By typing [F] you can enter the fill mode. Then by moving the cursor to the node you wish to fill and typing [RET], a data input menu will be displayed allowing you to enter the required data. Sample sensor and monitor node menus are shown along with their corresponding help screens in Figures 6.1.9 through 6.1.10a.



Fill Mode Commands: ARROWS, C, ENTER, ESC, ?(help)

Figure 6.1.8: Fill Mode

Description of Fill Mode Commands

ARROWS Move the crosshair in the appropriate direction.

C)rosshair Toggle the crosshair speed between fast and slow.

ENTER Enter the fill menu of the node which is positioned at the current location of the crosshair. This allows user to fill in the data associated with the node.

ESC Quit the fill command and return to the main option menu.

Press any key to continue.

Figure 6.1.8a: Fill Mode Help



SENSOR NODE: 82	NETHORK <- ESC
SENSOR NODE MENU	
Probability of detection: 3.0	
Signal persistence: PERMINENT:	
Enter SAVE to save current values, QUIT to exit without	SAVING:
♦ ♦ - To Choice	? ~ Help

Figure 6.1.9: Sensor Node Menu

		QUIT <- ESC
SENSOR	S STATEMENT HELP	
Definition	Options	Default
Probability of detection	constant between zero and one or a global variable	1.0
Signal persistence	TEMPORARY, FERMANENT	PERMANENT
parameters - denotes fields which (	may be entered in most fields cannot be defaulted es made to this menu screen du	
[RETURN] - To Continue		DONE

Figure 6.1.9a: Sensors Statement Help



MONITOR NODE: M1	NETWORK <- ESC
MONITOR NODE MENU	
List guard WAIT nodes to signal:	
	i de la companya di salah dari da salah d Barangan dari dari dari dari dari dari dari dari
Enter SAVE to save current values, QUIT to exit without sa	avingi <sub></sub>
•	
†∮ - To Chaice	? - Help

Figure 6.1.10: Monitor Node Menu

		BUIT <- ESC
	MONITORS HELP	
Definition	Options	Default 
List of guard WAIT node labels		**
parameters	may be entered in most fie	lds to note
<ul> <li>denotes fields which ca</li> <li>will cancel any changes session</li> </ul>	nnot be detaulted , made to this menu screen	during this
[RETURN] - To Continue		DONE

Figure 6.1.10a: Monitors Help

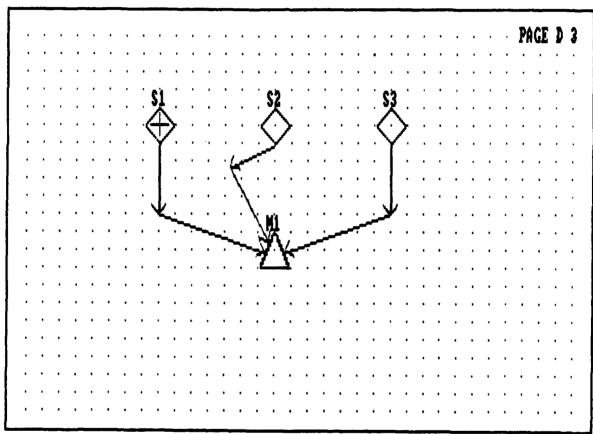
To aid in the construction of the adversary detection submodel, there are several support options available. You may [E]dit, [D]elete, or [M]ove objects on the page. You may change the screen display [O]ptions and check the status of the network builder. Or you may print a copy of the page to your EPSON-compatible printer.

The delete option allows you to remove a node, branch, or text from the diagram. Simply place the cursor at the location of the object you wish to delete and type [D]. As a safety precaution, the object you are about to delete will flash and you will be asked to verify your choice.

If you wish to change the node label of a node, just place the cursor on the desired node and type [E]. You will then be asked to enter the new node label.

To get a hard copy of your diagram you may use the (P)rint option. By typing [P] you can get a copy of the current page.

You may move a node or text around a page by placing the cursor on the object you wish to move and typing [M]. The object you selected will flash and will follow the cursor as you move about the page. Type [RETURN] to fix the object in its new location or type [ESC] to return the object to its original location.



Move Mode Commands: ARROWS, C, ENTER, ESC, ?(help)

Figure 6.1.11: Move Mode



Description of Move Mode Commands

ARROWS Move the crosshair and associated node or text in the

appropriate direction.

C)rosshair Toggle the crosshair speed between fast and slow.

ENTER Complete the move command by fixing the location of the node or text associated with the crosshair at its current

location. End move mode and return to the main command

menu.

ESC Abort the current move command and return the node or text

associated with the crosshair to its position prior to the start of the move command. End move mode and return to the

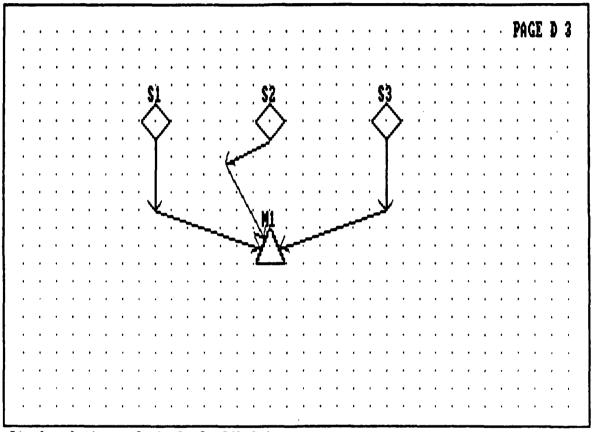
main command menu.

Press any key to continue.

Figure 6.1.11a: Move Mode Help



By typing [0] you can enter the display (0) ption mode. You can toggle the display of the grid points, the annotation, and the SNAP labels. You may also check on the status of the adversary detection submodel network builder by the [S] tatus option. An example of a status report for the facility submodel network builder is shown in Figure 4.1.9 and is explained in Section 4.1.



Display Options: G, A, L, S, ?(help)

Figure 6.1.12: Display Options



## Description of Display Option Commands

G)rid Toggle the grid display on or off.

A)nnotation Toggle the display of annotation on or off.

Toggle the display of SNAP node labels on or off. L)abel

Display a report on the status of the display options, status of the current display page and status of the overall facility. S) tatus

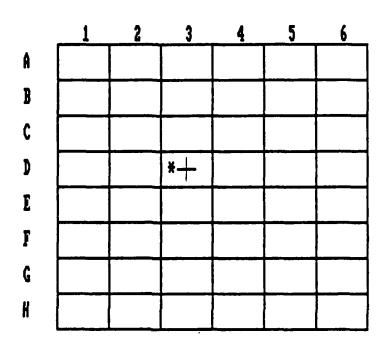
All display option commands return to the main command menu upon completion.

Press any key to continue.

Figure 6.1.12a: Display Options Help



Once you have completed a page you can exit from it by typing [Q]. The display control menu will then be displayed. An asterisk indicates what pages have been used to construct the submodel.



COMMANDS: ARROWS, [ENTER], (F)ind, (C)heck, e(X)it, (?)help

Figure 6.1.13: Display Control Menu After Constructing Network

To help verify that you have supplied all the data required, you may (C)heck the network for unfilled nodes by typing [C]. The program will then give you a listing of all the nodes that have been drawn but not filled.



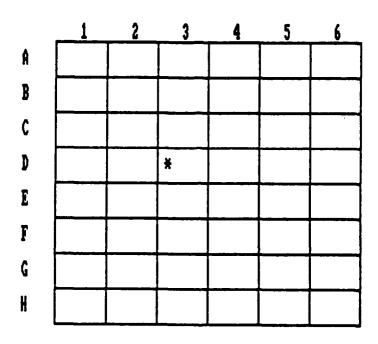
	1_	2	3	4	5	6
A						
B						
C						
D			*			
E						
F						
G						
H						

Node \$1, on page D, 3 has not been filled. Hit a key to continue.

Figure 6.1.14: Check Option



If you are interested in editing a node and you do not know which page contains the node, you may (F) ind it by typing [F]. You will then be asked for the node label. After entering the label the program will return with the page number containing the node. If the label is associated with a goto node, several locations for the node may appear.



## Node label?

Figure 6.1.15: Find Option

When you are ready to exit the adversary detection submodel network builder, you may type [X]. A screen will appear giving you the option to save the submodel or quit without saving. By entering a name, the submodel will be saved and will be identified by that name. You may then enter a description for the submodel. After entering a description, you will return to the 'ADVERSARY DETECTION MENU'.

WORKING SPACE: EXAMPLE	MAIN <- ES
ADVERSARY DETECTION SUBMODEL FILE NAME MENU	ı
Enter a name for this file: or type QUIT to leave this menu	DET2
	····
[RETURN] - To Continue	

Figure 6.1.16: Adversary Detection Submodel File Name Menu

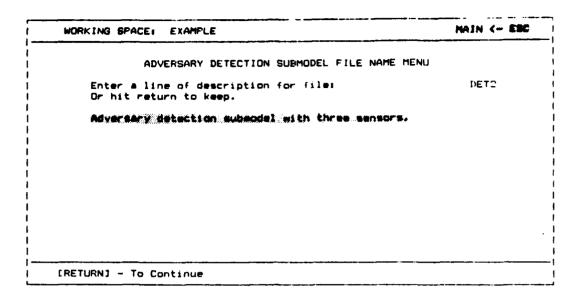


Figure 6.1.17: Adversary Detection Submodel Description

### 6.2 Edit an Adversary Detection Submodel

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If you wish to change an existing adversary detection submodel, select the edit option on the adversary detection menu.

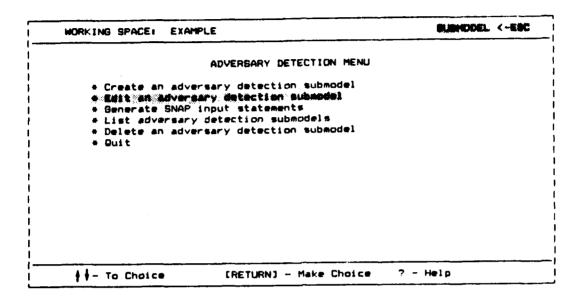


Figure 6.2.1: Adversary Detection Menu (Edit an Adversary detection submodel)

After you select the submodel you wish to edit from a list of those that you have created, Figure 6.2.2, you will re-enter the adversary detection submodel network builder. When you exit the network builder after your edit session, you may save the changes under the current name, create a new file, or overwrite an existing file by entering the name of an existing file.



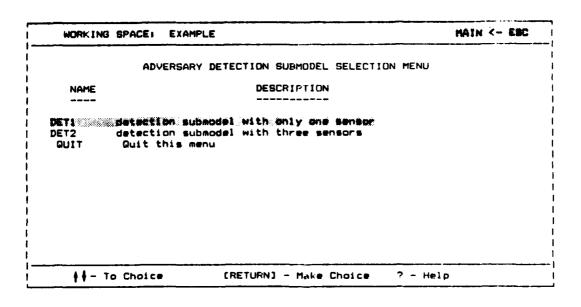


Figure 6.2.2: Adversary Detection Submodel Selection Menu

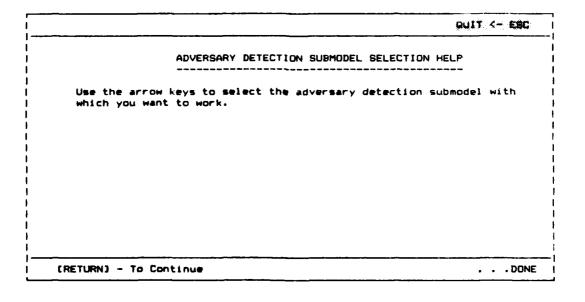


Figure 6.2.2a: Adversary Detection Submodel Selection Help

### 6.3 Generate SNAP Input Statements

You may generate the SNAP input statements for any of the adversary detection submodels you have created. Select the 'Generate SNAP input statements' option on the 'ADVERSARY DETECTION MENU', Figure 6.3.1. You may then choose from a list of the names of the submodels that you have built. The file that is generated ('name'.DSM) is located in your working space subdirectory.

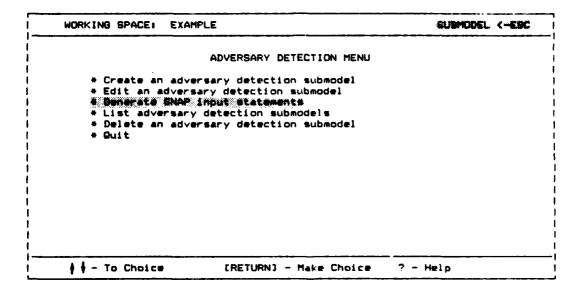


Figure 6.3.1: Adversary Detection Menu (Generate SNAP input statements)



### 6.4 List Adversary Detection Submodels

The list option will display the name and description of all the current adversary detection submodels.

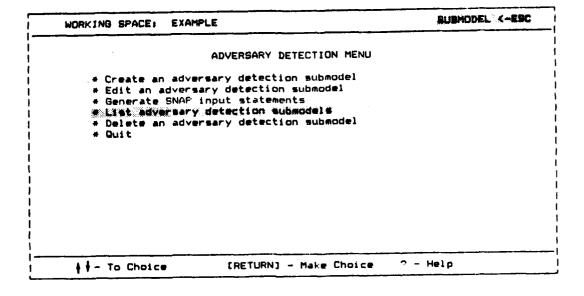


Figure 6.4.1: Adversary Detection Menu (List adversary detection submodels)

WORK	ING SPACE: EXAMPLE	MAIN (- EBC
	ADVERSARY DETECTION SUBMODEL DESCRI	IPTIONS
NAM 	DESCRIPTION	
ET1 ET2		
CRETU	JRN] - To Continue	DON

Figure 6.4.2: Adversary Detection Listing

## 6.5 Delete an Adversary Detection Submodel

If you wish to delete a submodel, select the 'Delete an adversary detection submodel' option. Then select the submodel you wish to delete from the displayed list. You will be asked to verify your choice.

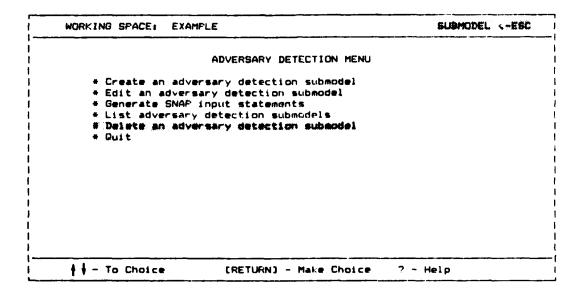


Figure 6.5.1: Adversary Detection Menu (Delete an adversary detection submodel)





WORKING	SPACE: E)	AMPLE	MAIN <- EBC
	ADVE	SARY DETECTION SUBMODEL	DELETION MENU
NAME		DESCRIPTION	
DET1		BubmpdBl with only one a submodel with three sens menu	
44 - T	o Choice	[RETURN] - Make Ch	oice ? - Help

Figure 6.5.2: Adversary Detection Submodel Deletion Menu

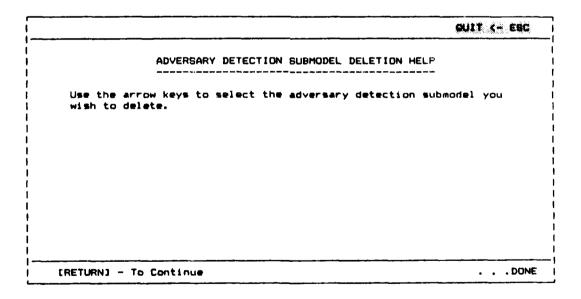


Figure 6.5.2a: Adversary Detection Submodel Deletion Help

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#### 6.6 Quit

To exit the adversary detection submodel section, select the 'Quit' option.

It is important to remember that you can build multiple adversary detection submodels for one facility and that each submodel is identified with a name, given it at the time of creation. You always have the option of editing any submodel at anytime.

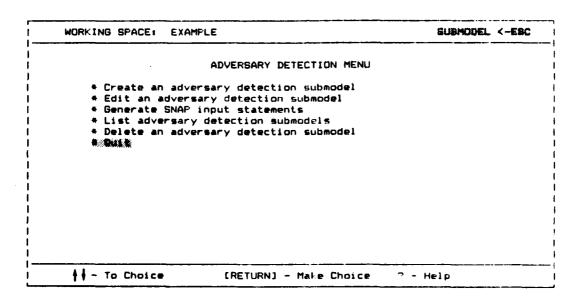


Figure 6.6.1: Adversary Detection Menu (Quit)



#### 7.0 WORKING WITH THE GUARD AND ADVERSARY SUBMODELS

The guard submodel is used to describe the movement of guard forces through a facility. It represents the normal patrol route of guard forces and the movement of the forces when adversaries are detected. The submodel also describes how auxiliary guard forces react to an adversary attack. You may construct multiple guard submodels to represent different patrol and defense plans. Each submodel can be parameterized to allow User2 to perform sensitivity analysis on certain variables.

The adversary submodel describes the attack logic of the adversary. For instance, an adversary force may sneak into a facility trying to avoid detection, or they may try to overtake a facility by force. You may construct multiple adversary submodels to represent different attack plans and parameterize them for User2.

Most of the guard and adversary submodels are built graphically by combining a series of nodes and branches to form a network to describe the flow of the forces through the facility. Chapter IV of the SNAP User's Manual describes the guard and adversary submodels in detail. In addition to the network portion of the submodel, there are five submodel statements that are not created graphically. They are the engagement, combinations, PENG, DENG, and BASE (for a guard submodel) or objective (for an adversary submodel) statements. Each of these is entered in a menu driven fashion. The procedure for entering these statements is given in Section 7.1.

#### 7.1 Create a Guard Submodel



This section will focus on describing how to construct a guard submodel. It is identical to the procedure used to construct an adversary submodel, with the exception of a small number of nodes which may be created in one submodel type, but not the other.

Once you have selected to work with the guard submodel, the 'GUARD MENU' will be displayed. Select the 'Create a guard submodel' option.

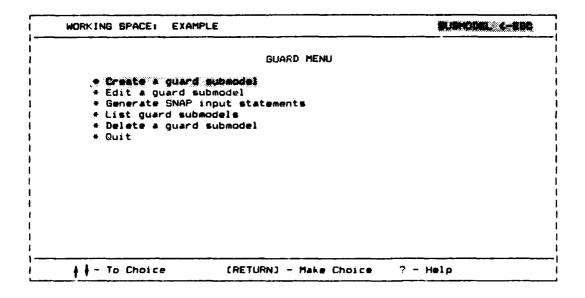


Figure 7.1.1: Guard Menu (Create a guard submodel)

#### GUARD SUBMODEL HELP

Choose to enter the network builder by creating or editing a guard submodel. In addition, from this menu you may translate network symbols into SNAP input statements for a submodel, list or delete submodels.

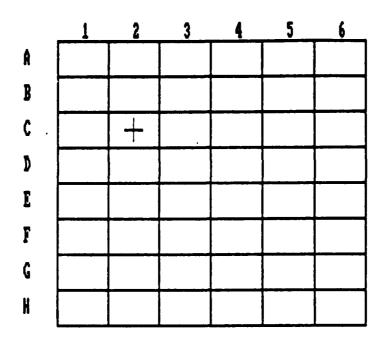
[RETURN] - To Continue

. . DONE

Figure 7.1.la: Guard Submodel Help

The network builder page selection screen will appear on your console. It contains a grid which represents the pages available for submodel construction and a command line. The pages are identified by the letters and numbers bordering the grid. You may move the cursor around the grid by using the arrow keys and select the page you wish to use by typing [RETURN]. For example, the cursor is pointing to page C,2 in Figure 7.1.2. A description of all the commands is shown in Figure 7.1.2a. Each will be discussed later in this section.





COMMANDS: ARROWS, [ENTER], (F)ind, (C)heck, (S)tate, e(X)it, (?)help

Figure 7.1.2: Network Builder Page Selection Screen

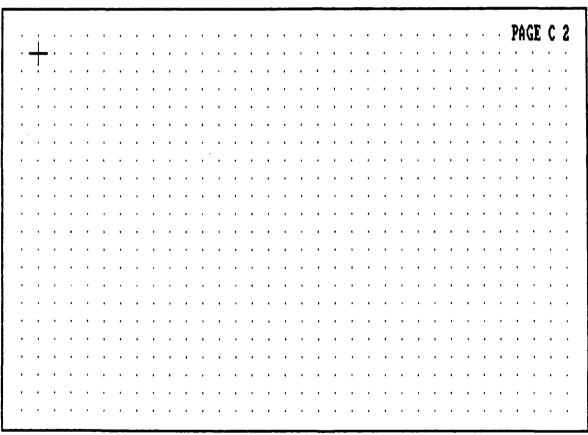


	Description of Display Control Commands
ARROWS	Move cursor from box to box on the screen. Each box is associated with a page on which the network may may be drawn.
[ENTER]	Hitting ENTER selects the page associated with the box that the cursor is in.
(F)ind	Search the network for a node entered from the terminal. The page on which the node occurs will be returned if it is found.
(C)heck	Check if all nodes in the network have been filled. A list containing the label and location of the nodes that have not been filled will be shown on the screen.
(\$) tate	Define Statements associated with this submodel.
(H)elp	Prints this information to the screen.
e(X)it	Causes the program to terminate.

Press any key to continue.

Figure 7.1.2a: Network Builder Page Selection Screen Help

The contents of the page you selected will be displayed on the screen. The page id will appear in the uppermost right corner and a list of available options will be written along the bottom of your screen. The commands are described in the help file, which is listed in Figures 7.1.3a and 7.1.3b. The basic network commands [D]elete, [M]ove, [E]dit, [P]rint, and [O]ptions are the same as those for the facility submodel and adversary detection submodel network builders.



Commands: ARROWS, C, N, L, G, R, W, T, S, X, B, F, A, D, M, E, P, O, Q, ?(help)

Figure 7.1.3: Submodel Network Builder Page



## Description of SNAP Guard Subnetwork Builder Commands

Move the crosshair in the appropriate direction. **ARRONS** Toggle the crosshair speed between fast and slow. C)rosshair Enter an ENTER node at the current crosshair location. e(N)ter Enter an ALLOCATE node at the current crosshair location. a(L)locate Enter a GOTO node at the current crosshair location. G) o to R) tb Enter a RTB node at the current crosshair location. Enter a WAIT node at the current crosshair location. W) ait Enter a TASK node at the current crosshair location. T) ask Enter a SIGNAL node at the current crosshair location. S)ignal Enter an EXII node at the current crosshair location. e(X)it B)ranch Enter the branch drawing mode.

Press any key to continue.

Figure 7.1.3a: Submodel Network Builder Page Help





F)ill Fill node menu at current crosshair location.
A)nnotate Enter text at the current crosshair location.
D)elete Delete current item. (Confirmation will be requested).
M)ove Hove the node or text at the current crosshair location.
E)dit Edit the node under the current crosshair location.
P)rint Generate a hardcopy of the current facility page on the printer.
O)ptions Select current display options.
Q)uit Quit this page of the SNAP network builder.

The ESC key may be used to cancel any command in progress.

Press any key to continue.

Figure 7.1.3b: Submodel Network Builder Page Help

You are now ready to begin building your network. Use the arrow keys to move the cursor to the location where you wish to enter a node. Type the letter corresponding to the appropriate node and then enter the node label in the field which will appear in place of the command line. Once the label has been entered the node will be drawn in the indicated location.

You should keep in mind that nodes are drawn on the screen left justified to the position of the cursor. You should also try not to draw too many nodes onto one page. You have 48 pages available to construct your submodel.

EG1 .				PAGE C 2
ا تحد	 		 	
	 	'.' .	 	

Commands: ARROWS, C, N, L, G, R, W, T, S, X, B, F, A, D, M, E, P, O, Q, ?(help)



Continue constructing the network by adding branches and nodes. There is no contiguous restriction for building the network, so you can add a node or branch anywhere at anytime. Since a branch has direction representing the flow of logic, each branch segment must begin at the endpoint of the branch segment preceding it or at a node. These branch segments can be drawn in any order as long as the final branch connecting the nodes is contiguous and does not consist of branches whose directions differ.

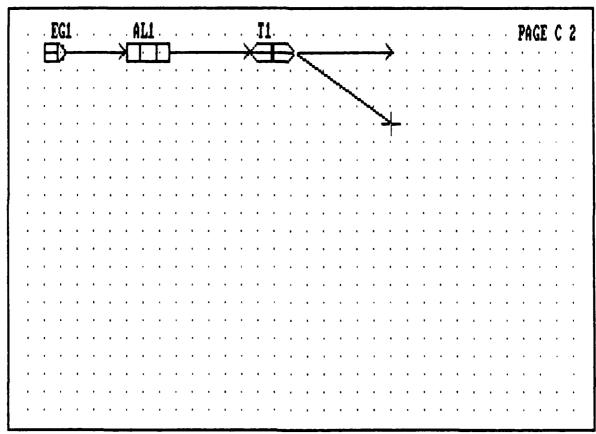
A branch that does not have an end node will be coded as a RETURN branch. For more information concerning RETURN branches, reference the SNAP User's Manual, page 48.

In some cases you may want to specify the sequence in which the branches will be taken. To accomplish this you have the option of ranking your branches when you are inside the network builder. Each branch may have a rank between -99 and 100, with a default ranking of 0. The lower the rank the higher the priority.

Other restrictions on branches are that they can only contain 20 bend points, they cannot emanate from a goto or exit node, and there cannot be any more than 99 branches leaving a single node.



To input a branch move the cursor to the point where the branch is to begin and type [B]. Then by moving the cursor the branch is drawn. To place bend points on a branch type [SPACE] at the desired location and continue on with the branch. To end the branch, type [RETURN] at the desired location.



Branch Mode Commands: ARROWS, C, SPACE, ENTER, ESC, H(elp)

Figure 7.1.5: Branch Mode



# Description of Branch Mode Commands Move the crosshair in the appropriate direction and update the "rubber band" branch from the current origin point to the crosshair location. (The initial origin point is the current crosshair location at the time the line mode is initiated, but it may be updated by the SPACE command. See below.) C)rosshair Toggle the crosshair speed between fast and slow. Make the current "rubber band" branch permanent, and then begin entry of a new branch with its origin at the current

Make the current "rubber band" branch permanent, and then return to the main command menu. ENTER

ESC Abort entry of the current branch and return to the main

command menu.

crosshair location.

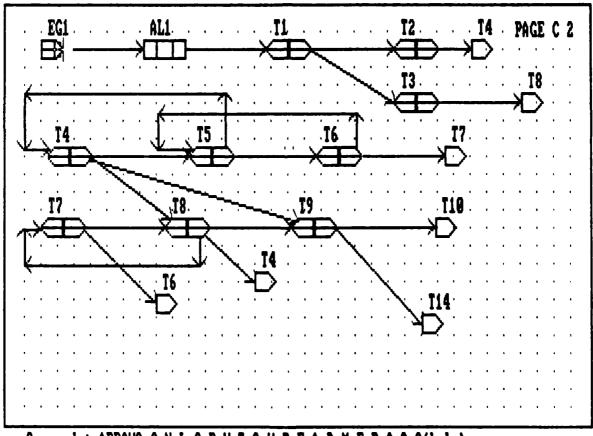
Press any key to continue.

ARROWS

SPACE

Figure 7.1.5a: Branch Mode Help

The goto node is used to continue a network from one page to another. In the example below the branches leaving task node, T9, actually connect with the nodes T10 and T14 on some other page. The goto node is used to show this relationship. The label for the goto node must be the same as the node it points to. It is not necessary, however, that the goto node point to a node on another page. You may use it to point to a node on the same page. This capability reduces the number of long branches you may need on a page. In the example shown in Figure 7.1.6, task node T2 is connected to task node T4 through the use of a goto node.

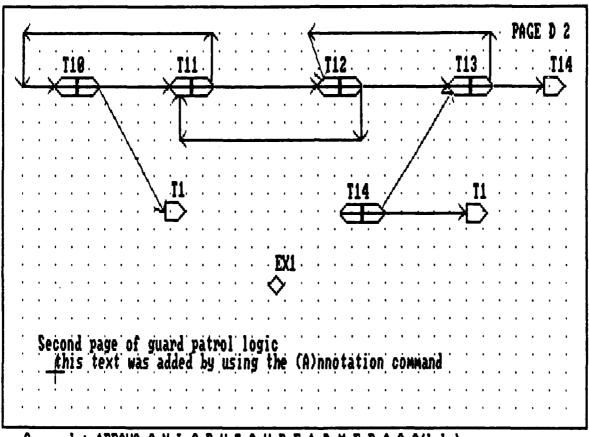


Commands: ARROWS, C, N, L, G, R, W, T, S, X, B, F, A, D, M, E, P, O, Q, ?(help)

Figure 7.1.6: The Goto Node

You may enter a line of text on your page by using the (A)nnotation command. The text is left-justified at the current location of the cursor.



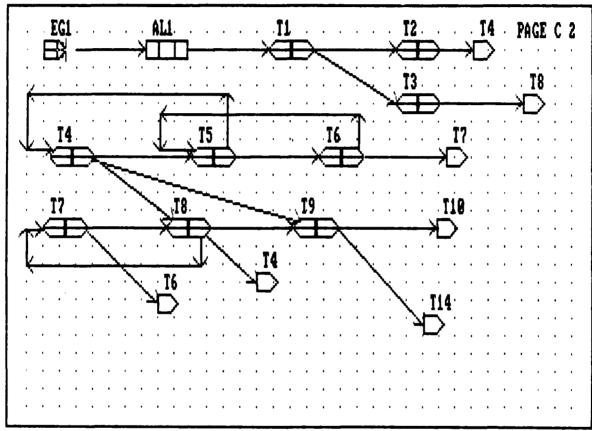


Commands: ARROWS, C, N, L, G, R, W, T, S, X, B, F, A, D, M, E, P, O, Q, ?(help)

Figure 7.1.7: Network Annotation



At some time during the construction of your network you must supply supporting data for every node, except the goto nodes. By typing [F] you will enter the (F)ill mode.



Fill Mode Commands: ARROWS, C, ENTER, ESC, ?(help)

Figure 7.1.8: Fill Mode



# Description of Fill Mode Commands

ARROWS Move the crosshair in the appropriate direction.

C)rosshair Toggle the crosshair speed between fast and slow.

ENTER Enter the fill menu of the node which is positioned at the current location of the crosshair. This allows user to fill in the data associated with the node.

ESC Quit the fill command and return to the main option menu.

Press any key to continue.

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Figure 7.1.8a: Fill Mode Help

The new set of commands directs you to move the cursor to the node that you wish to fill and to type [RETURN]. The data input menu that is shown will depend on the type of submodel that you are building.

The data input menu for all seven node types is shown on the next several pages. Each menu is followed by its corresponding help screen. Note the difference between the guard and adversary enter node menus.

		NETWORK < ES
	GUARD ENTER NODE MENU	
Label: EG1	Comment:	
Time of arr	ival (minutes): 💥 💇 💢	
Initial fac	lity location:	
Maximum numb	per of branches to be taken:	
Do you wish	to define branches? MO	
Enter SAVE	to save current values, QUIT to exit	without saving:

Figure 7.1.9: Guard Enter Node Menu

		GUIT <- ESC
GUARE	ENTER NODE HELP	
Definition	Options	Default
Time of arrival (minutes)	a constant	O
Initial facility location	a facility label	blank
Maximum number of branches to be taken	positive integer	1
@xx — where xx is a number, parameters	may be entered in most fiel	ds to note
<pre>#### - denotes fields which c ESC - will cancel any change session</pre>	annot be defaulted as made to this menu screen	during this
session  [RETURN] - To Continue		DON

Figure 7.1.9a: Guard Enter Node Help



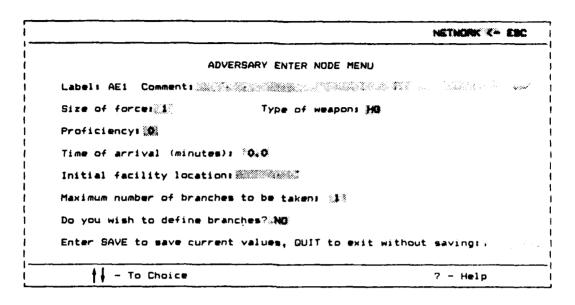


Figure 7.1.10: Adversary Enter Node



		QUIT <- ESC
ADV	VERBARY ENTER NODE HELP	
Definition	Uptions	Default
Force size	integer	1
Weapon type	IIB chandqun GO shotqun GO semi-automatic GM-submachine gun FO fully automatic NW-no weapon	1463
Proficiency	-100 to 100	o
CRETURN) - To Continue		

		and the same of th	QUIT <- EBC
Time of	arrival (minutes)	a constant	o
Initial	facility location	a (acility label	<b>b1</b> ank
Maximum to be	number of branches taken	postive integer	J
**** -	parameters denotes fields which c	may be entered in most field annot be defaulted s made to this menu screen d	

Figure 7.1.10a: Adversary Enter Node Help



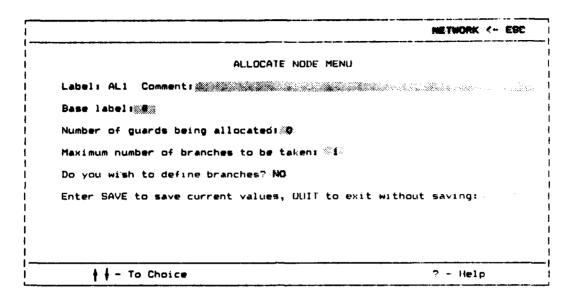


Figure 7.1.11: Allocate Node Menu

		BUIT (- ESC
	ALLOCATE NODE HELP	
Definition	Options	Default
Base label	label of a BASE	##
Number of guards being allocated	integer >= 0 or global ∨ariable	o
Maximum number of branches to be taken	positive integer	1
<pre>exx - where xx is a number, parameters</pre>	may be entered in most fields	to note
	annot be defaulted s made to this menu screen dur	ing this
[RETURN] - To Continue		DONE

Figure 7.1.lla: Allocate Node Help



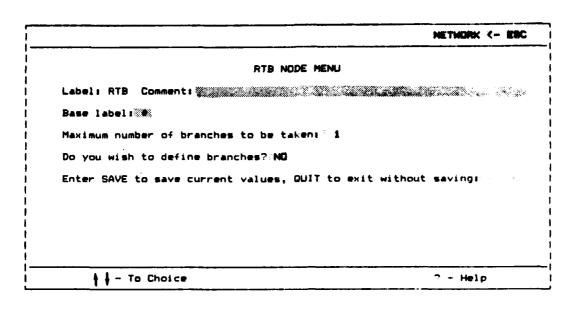


Figure 7.1.12: RTB Node Menu

		QUIT <- ENG
	RTB NODE HELF	
Definition	Options	Default
Base label	label of a BASE	**
Maximum number of branches to be taken	positive integer	1
<pre>exx - where xx is a number, r parameters</pre>	may be entered in most field	ds to note
**** - denotes fields which ca	annot be defaulted	
ESC - will cancel any changes session	s made to this menu screen (	during this
[RETURN] - To Continue		DON

Figure 7.1.12a: RTB Node Help



······································	NETHONK X - ESC
SIG	GNAL NODE MENU
Label: SIGN Comment:	
Signal specification: 漁棚	:••::
Maximum number of branches to	be taken: 🎆
Do you wish to define branches	s? (MC)
Enter SAVE to save current val	lues, QUIT to exit without savings
l∮- To Choice	? - Help

Figure 7.1.13: Signal Node Menu



		GUIT <= EBC
	BIGNAL NODE HELP	
Definition	Options	Defaul
Signal specification	See next page	**
Maximum number of branches to be taken	positive integer	1
exx - where xx is a number, parameters	may be entered in most field	lds to note
**** - denotes fields which c	annot be defaulted	
ESC - will cancel any change session	es made to this menu screen	during this
[RETURN] - To Continue		MORE

The SIGNAL specificati	ion takes one of two ger	neral force
me sisme specificat	ion takes one of two ge	neral turms.
RS1	RS2	RS3
LOGIC POINT or	TEMPURARY	FISV
WAIT node label	PERMANENT	TRAN blank
WHII HOUE ISSEI	r Em migel	DIGHT
ADVERSARY	Facility Location or	TISV Tran
GUARD	Force Identifier	Network node
		label where
		force goes
RETURN] - To Continue		DO

Figure 7.1.13a: Signal Node Help



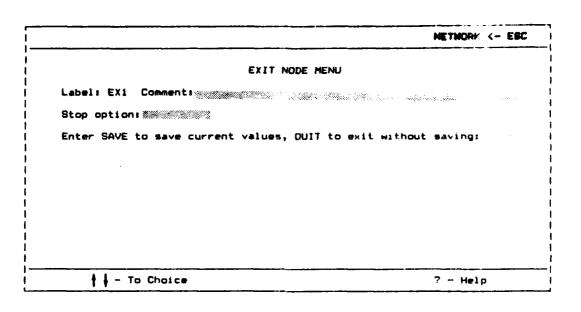


Figure 7.1.14: Exit Node Menu

		BULL 4- EBC
	EXIT NODE HELP	
Definition	Options	Default
Stop option	blank or STOP	blank
@xx - where xx is a number	r, may be entered in most fie	lds to note
parameters		
**** - denotes fields which		during this
#### - denotes fields which ESC - will cancel any char	h cannot be defaulted	during this

Figure 7.1.14a: Exit Node Help



# TASK NODE MENU Label: T12 Comment: Facility location: Mode: Mode: Mode: Min engagement label: Start engagement label: Maximum number of branches to be taken: Define engagement pointers: MO Do you wish to define branches? NO Enter SAVE to save current values, DUIT to exit without saving: 1 - To Choice ? - Help

Figure 7.1.15: Task Node Menu

		BUIT <- ESC
	TASK NUDE HELP	
Definition	Options	Default
Facility location	facility label or blank	blank (no change
Mode	Guard: FATROL, NEUTRALIZE, blank	blank (no change
	Adversary: ENTER, PENETRATE, EXIT,blank	
Task time	See User's Guide	CON (O)
[RETURN] - To Continue		MORE

Figure 7.1.15a: Task Node Help



		QUIT <- ESC
Auxiliary action	ACTIVATE (LBL) DISABLE (LBL) SUT (GLBL, value) CAL (MLBL) MARG (TIMR) RECORD (TIMR)	blanf (no auciliar artion)
Win engagement label	blank, CONTINUC SIOP, node label	b1 ani
Start engagement label	blank, or node lahel	bl ank
[RETURN] - To Continue		MORE

			QUIT <- EBC
	number of branches taken	positive integer	1
<b>е</b> хх -	where xx is a number, parameters	may be entered in most field	s to note
**** -	denotes fields which c	annot be defaulted	
ESC -	will cancel any change session	s made to this menu screen d	uring this
COCTUDA	1] - To Continue		DON

Figure 7.1.15a: Task Node Help (continued)



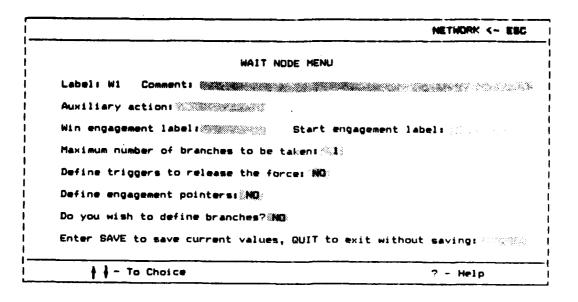


Figure 7.1.16: Wait Node Menu

		QUIT <- ESC
	WAIT NODE HELP	
Definition	Options	Default
Auxiliary action	MERGE, TRANSFER, or blank	blank
Win engagement label	blank CONTINUE STOP Node label	blank
Start engagement label	blank or node label	blank
Maximum number of branches to be taken	positiv <b>e</b> int <b>eg</b> er	1
[RETURN] - To Continue		MORE

	QUIT <- EBC
efine triggers to release the force	See HELP under trigger menu
efine engagement pointers	See HELP under engagement pointer menu
parameters	may be entered in most fields to note
### - denotes fields which c SC - will cancel any change session	annot be defaulted screen during this made to this menu screen during this
(RETURN) - To Continue	DON

Figure 7.1.16a: Wait Node Help

The wait node triggers define the conditions that must exist to release the forces at the wait node. To describe the triggers, answer 'yes' to the define trigger question. You must follow the format for triggers exactly as shown in the trigger help information or a SNAP input error will be detected at the time of execution. You must supply a trigger for every wait node.

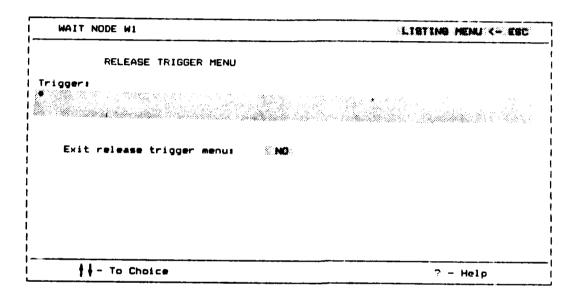


Figure 7.1.17: Release Trigger Menu



QUIT <- ESC

### TRIGGER HELI

TRIGGER

WAIT FOR

GUARD, facility label

guard at facility location

ADVERSARY, facility label

adversary at facility location

ADD, ADD label

ADD to be triggered

SIGNAL

signal from another force

TINC, value or global

a period of time in munites

variable

ENGAGEMENT, facility label

engagement at facility location

[RETURN] - To Continue

. . . MORE

QUIT <- ESC

Triggers may be combined with an .AND. operator to form combined triggers (e.g., GUARD,SP1.AND.ADD,M1). Multiple triggers (OR conditions) may be specified by separating (possibly combined) triggers with .OR. operators (e.g., GUARD,SP.AND.ADD,M1.OR.TINC,2).

Any trigger, except TINC, can be preceded by a "NOT." operator. The "NOT." applies only to the trigger immediately following.

EXAMPLES

(GUARD, SP1. DR. NOT. ENGA, SF6)

(NOT. ADD, 51)

(NOT.GUA, SPZ. AND. NOT. ENGA, SPZ. OR. TINC, 5)

[RETURN] - To Continue

. . .MORE

Figure 7.1.17a: Trigger Help



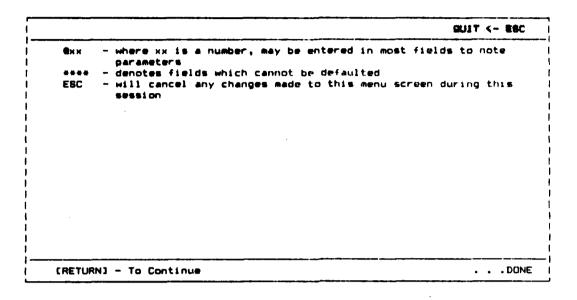


Figure 7.1.17a: Trigger Help (continued)

At the time you supply data for a node you will have the option to define the branches that emanate from it. By answering 'yes' to the define branches question, a list of all branches leaving that node will be displayed on the screen. You may cursor to the branch you wish to define and select it by typing [RETURN].

BRA	NCHES	FROM	NODE	TB			NODE	MENU	<- ESC
TYPE DEC DEC DEC	T9 T4				COMMENT		-	KANI 3 1 2	FDR- 110N 0.0 0.0
DEC	17	Quit	Branch	Editing	Session an	d Save		-	9.0
	1 - To	Choi	ce	(RE	TURN] - Mak	e Choice	7 .	- Help	

Figure 7.1.18: Branch Selection List Menu

	QUIT <- ESC
BRANCH SELECTION HELP	
Arrows - move up or down the list one item at a time.	
PgUp - move up the list a page at a time.	
PgDn - move down the list a page at a time.	
Home - move to the top of the list.	
End - move to the bottom of the list.	
RETURN - Fill/Edit branch currently selected.	

Figure 7.1.18a: Branch Selection Help



The branch input menu for a regular branch will be displayed for all new branches. If there is only one branch leaving the node, you will enter this menu directly, skipping the branch listing menu. If you change the branch type to decision, DEC, or probability, PRO, additional data is required. The decision and probability branch menus are displayed in Figures 7.1.20 and 7.1.21.

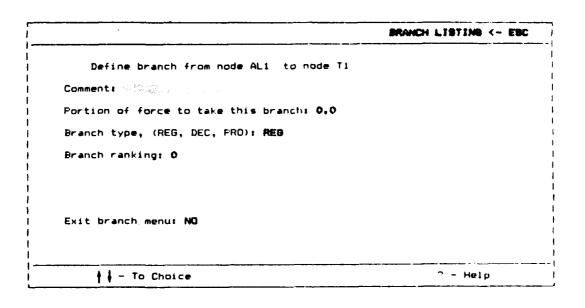


Figure 7.1.19: Regular Branch Menu



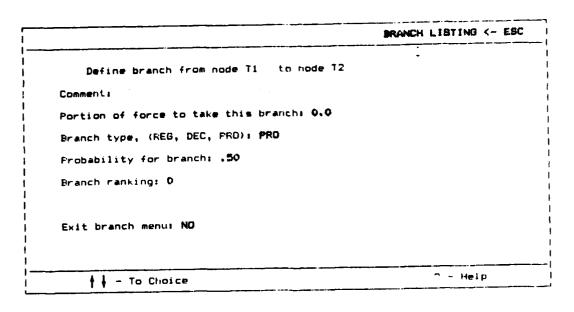


Figure 7.1.20: Probability Branch Menu

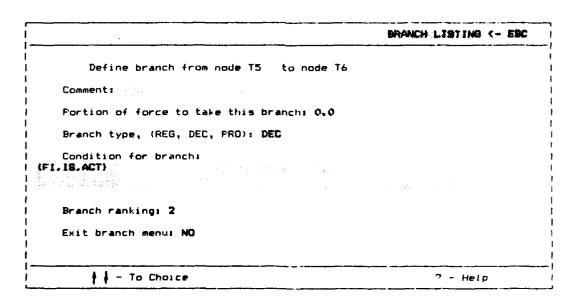


Figure 7.1.21: Decision Branch Menu



		DUIT <- ESC
BR	ANCH HELP	
Definition	Options	Default
Portion of the force to take this branch	0 - all available <1 - fraction of force 1 - number of individuals to send	o
Branch Type	REGULAR or DECISION or FROEABILISTIC	Reg
Ranking is used to determine the order in which branches are to be evaluated. Lower the ranking the higher the priority.	-99 to 100	o
[RETURN] - To Continue		MORE

		QUIT <- ESC
DECISION Branching		
Condition to test.  If it is true, the branch is taken	See User's Guide	**
PROBABILISTIC Branching		
Probability of selecting this branch	constant or global variable between O and 1	0.5
Фхх - where xx is a number, may parameters		s to note
<pre>ee - denotes fields which cann ESC - will cancel any changes a     session</pre>		uring this
(RETURN) - To Continue		DONE

Figure 7.1.21a: Branch Help



To enter the wait and task node engagement pointers you must answer 'YES' to the define engagement pointers question. The list of engagement pointers will appear initially blank. To add an engagement pointer to the list type [A].

FACILITY ENGAGEMENT NO. LOCATION RANGE LAREL SAVE	EN	GAGEMENT POINTER	12	NODE MENU C# ESC	
		LOCATION		LAREL	

Figure 7.1.22: Engagement Pointer Selection List Menu

ENBAGEMENT POINTER SELECT HELP	
Arrows - move up or down the list one item at a time.	
PgUp - move up the list a page at a time.	
PgDn - move down the list a page at a time.	
Home - move to the top of the list.	
End - move to the bottom of the list.	
A - Add an engagement pointer to list above current lin	ıe.
D - Delete engagement pointer currently selected.	
RETURN - Edit engagement pointer currently selected.	

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Figure 7.1.22a: Engagement Pointer Selection Help

An input menu will be displayed allowing you to enter the data associated with the new engagement pointer. The range must be specified as an integer. To save and exit the menu you must type [RETURN] in the last data field.

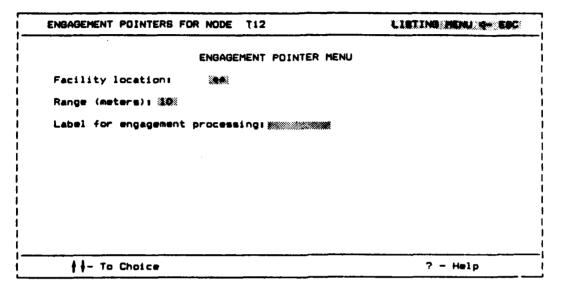


Figure 7.1.23: Engagement Pointer Menu

		GUIT (- ESC
ENGAGEM	ENT POINTER HELP	
Definition	Options	Default
Facility location	facility label	并表
Range	distance in meters	10
Label for engagement processing	PENG label	as specified or ENGAGEMENT card
RETURN - in last field to return @xx - where xx is a number, ma parameters **** - denotes fields which can	y be entered in most fi	
ESC - will cancel any changes session		n during this
[RETURN] - To Continue	•	DONE

Figure 7.1.23a: Engagement Pointer Help

Once you leave the data input menu, the engagement pointer list will be displayed containing the updated information. You may continue to add new engagement pointers or edit or delete old pointers. To save the changes you made during the session select the 'SAVE' option.

EN	GAGEMENT FOINTER	12	NODE MENU <- ESC	
NO. 1	FACILITY LOCATION 03 DAVE	RANGE 10	ENGAGEMENT LAREL PG1	
		······	DEL <ret> - EDIT</ret>	? - Help

Figure 7.1.24: Engagement Pointer Selection List Menu After Input

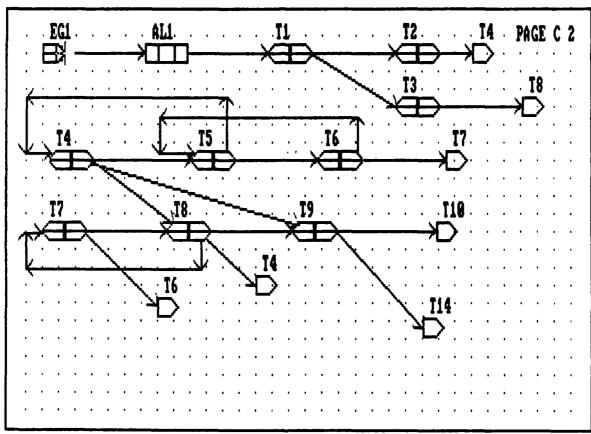
There are several support commands available to aid you in the construction of your submodel. These commands are [D]elete, [M]ove, [E]dit, [P]rint, and [O]ptions.

The delete command allows you to remove a node, branch or annotation from a page. To delete an item place the cursor in the middle of the node or branch, or at the beginning of a text string and type [D]. The item selected for deletion will begin to flash and you will be asked to verify the selection. Answer yes to the query and the item will be deleted.

The edit command allows you to change the node label of a node. You can change the label by placing the cursor in the middle of the node you wish to edit and type [E]. Then enter the new label in the field which appears. The node will be redrawn with the new label.

The print command is used to print a hard copy of the current page. By typing [P] and verifying that you want a copy, the page is printed.

The move command is used to move a node from one position to another. Place the cursor in the middle of the node you wish to move and type [M]. You can then move the node around the page using the arrow keys. Type [RETURN] to fix the node at its new location.



Move Mode Commands: ARROWS, C, ENTER, ESC, ?(help)

Figure 7.1.25: Move Mode



## Description of Move Mode Commands

ARROMS Move the crosshair and associated node or text in the

appropriate direction.

C)rosshair Toggle the crosshair speed between fast and slow.

ENTER Complete the move command by fixing the location of the node or text associated with the crosshair at its current location. End move mode and return to the main command

menu.

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exerces.

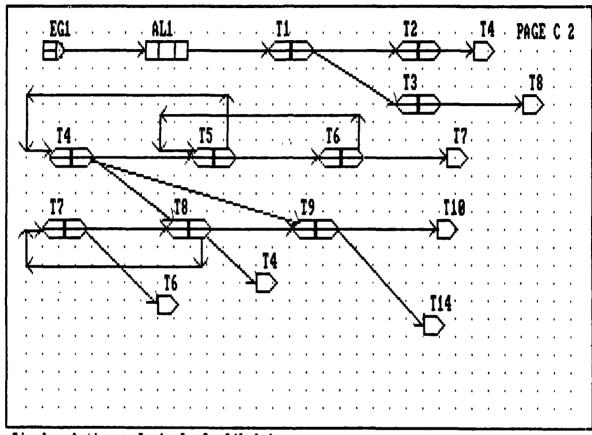
\$2500 X253 | KG3 MAGOO | KK4 & C&C | MO25 XX/

Abort the current move command and return the node or text associated with the crosshair to its position prior to the start of the move command. End move mode and return to the main command menu.

Press any key to continue.

Figure 7.1.25a: Move Mode Help

The display [O]ption command toggles the display of the grid, the node labels, and the annotation.



Display Options: G, A, L, S, ?(help)

Figure 7.1.26: Display Options Mode



# Description of Display Option Commands

G)rid Toggle the grid display on or off.

A)nnotation Toggle the display of annotation on or off.

L)abel Toggle the display of SNAP node labels on or off.

S) tatus Display a report on the status of the display options, status of the current display page and status of the overall facility.

All display option commands return to the main command menu upon completion.

Press any key to continue.

Figure 7.1.26a: Display Options Mode Help



You may also display the status of your submodel. This option gives you a summary of the network status, page status, and display status. The network status consists of the number of branches, nodes, and annotations currently in the submodel and the number of bytes free in memory. Since memory is dynamically allocated, the size of your submodel is limited only by the amount of memory you have on your microcomputer. As shown in Figure 7.1.27, the number of bytes free will always read 65000 until you have less than that amount available.

Network: C:\SNAP\USER1\SCRATCH

Network Status	Page Status	Display Status
40 Branches	Page No. D, 3	Grid: ON
25 Nodes	28 Branches	Annotation: ON
2 Annotations	18 Nodes	Nodes: ON
65000 Bytes Free	0 Annotations	Node Labels: ON

Press any key to continue.

Figure 7.1.27: Network Status Diagram

Once you have completed the construction of the graphical portion of your submodel, exit the current page by typing [Q]. The page selection screen will be displayed. Pages with submodel information on them are denoted by an asterisk.



	1	2	3	4	5	6
A						
B						
C		*+	*			
D		*				
E						
F						
G						
H						

COMMANDS: ARROWS, [ENTER], (F)ind, (C)heck, (S)tate, e(X)it, (?)help

Figure 7.1.28: Network Builder Page Selection Screen After Network Construction



To verify that you have supplied the data for each node, you can perform a check on the network by typing [C]. A message will be displayed at the bottom of the screen each time an empty or unfilled node is found. You must hit any key to continue the search. When it has completed, the message 'Finished search. Hit any key to continue' will be displayed. You must fill every node before you can generate a valid SNAP input statement file.

	1	2	3	4	5	6
A						
B						
C		¥	×			
D		*				
E						
F						
G						
H						

Node T6, on page C, 2 has not been filled. Hit a key to continue.

Figure 7.1.29: Check Option

To find the page on which a node is located, you may use the (F)ind command. By typing [F] and entering the node label in the field that is displayed, the program will return the page identifier in which the node is found. If a node is associated with goto nodes, the program returns the page identifier for all goto nodes and the node itself.

1	2	3	4	5	6
· · · · · · · · · · · · · · · · · · ·	×	*		-	
	¥				
!					
	1	*	* *	* *	* *

# Node label? ■

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Figure 7.1.30: Find Option

To complete the submodel you must supply the engagement, combination, PENG, DENG, BASE and objective statements. To enter the statement definition mode you must type [S] while on the page selection screen. The 'STATEMENT DEFINITION MENU' will be displayed. The guard and adversary statement definition menus are shown in Figures 7.1.31 and 7.1.32. The two submodel menus differ only in the third statement type. For a guard submodel you must define BASE statements and for an adversary submodel you must define an objective statement.

		PAGE SELECT <- ESC
	STATEMENT DEFINITION MENU	
->	Define engagement statement	
	Define combinations statement	
	Define BASE statements	
	Define PENG statements Define DENG statements	
	Quit statement definition menu	
·		
4	- To Choice	7 - Help

Figure 7.1.31: Guard Statement Definition Menu



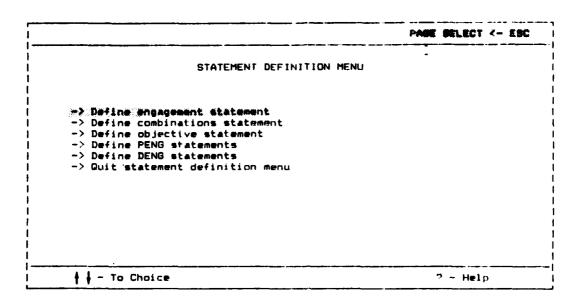


Figure 7.1.32: Adversary Statement Definition Menu

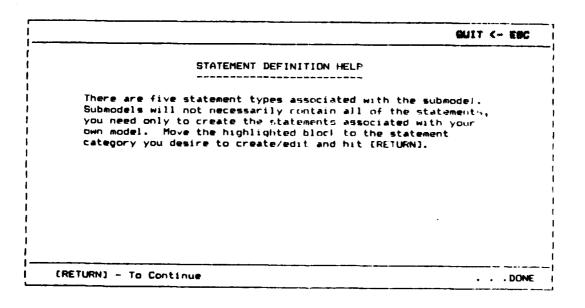


Figure 7.1.32a: Statement Definition Help



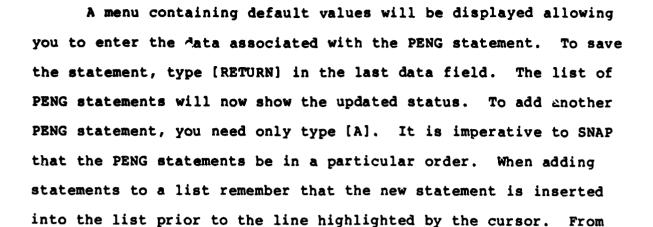
The procedure for supplying the BASE, PENG and DENG statements are identical. The PENG statement will be used as an example. Select the PENG statement option to list all of the defined PENG statements. It will initially be blank. To add PENG statements to the list type [A].

PENG	STATEMENT	DEFINITION		STATE. DEF. <- ESC
10.	PENG LABEL BAVE	CORRESPONDING DENG	TIME INTERVAL	-
† .	- To Cho	ice A - ADD D -	DEL CRETT - EDIT	? - Help

Figure 7.1.33: PENG Statement Selection List Menu

		OUIL <- ESC
	PENG STATEMENT SELECT HELP	
Arrows - move u	p or down the list one item at a	n time.
PgUp - move up	the list a page at a time.	
PgDn - move dom	n the list a page at a time.	
Home - move to	the top of the list.	
End - move to	the bottom of the list.	
A - Add a peng	statement to list above current	line.
D - Delete peng	statement currently selected.	
RETURN - Edit p	eng statement currently selected	d.
[RETURN] - To Con	tinue	DO

Figure 7.1.33a: PENG Statement Select Help



the listing menu you may also delete a PENG statement (type [D])

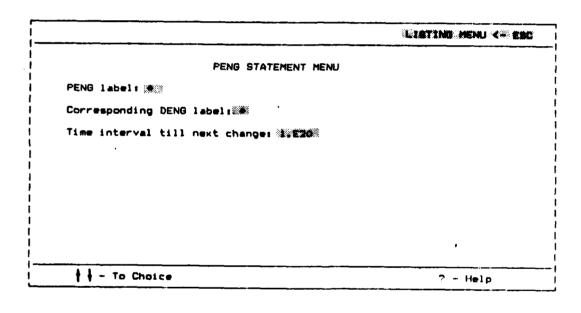


Figure 7.1.34: PENG Statement Menu

THE STATE OF THE S

or edit (type [RET]) an existing statement.



		QUIT <- EBC
PE	ING STATEMENT HELP	
Definition	Options	Default
PENG label	4 characters man	**
DENG label	label of DENG in same (GURAD or ADVESARY) sectio	## In
Time interval till next change of characteristic	numeric (minutes)	1.E20
parameters	, may be entered in most fields	s to note
**** - denotes fields which	cannot be defaulted	
ESC - will cancel any changes session	ges made to this menu screen du	iring this
[RETURN] - To Continue		CONE

Figure 7.1.34a: PENG Statement Help

The data input menus for the DENG and BASE statements are given on the next several pages. The procedure for supplying them is identical to that for the PENG statement.



	LISTING MENU <- EBC
DE	NG STATEMENT MENU
DENG label:	Posture: <b>STANDING</b> :
Exposure while firing: 2	00 Exposure while loading: 100
Percent time delay: (0)	
Self posture firing degra	adation: 🛡
Illumination firing degre	adation: «Q
Suppression status: NO	
Tactic: ASSAULT	
↑ - To Choice	? - Help

Figure 7.1.35: DENG Statement Menu

-	
41	2
100	
76	-
•	

		DUIT (+ ESC
. Di	ENG STATEMENT HELP	
Definition	Options	Default
DENG label	4 characters max	**
Posture	CROUCHING, STANDING, OR PRONE	STANDING
Exposure while firing	numeric (0-100)	100
Exposure while loading	numeric (0-100)	100
Percent time delaying	numeric (0-100)	0
[RETURN] - To Continue	······································	MORE

Self posture firing degradation	numeric (0-100)	OUIT <- ESC
Illumination firing degradation	numeric (0~100)	o
Suppression status	YES, NO	NO
Tactic	ASSAULT, DEFENSE	ASSAULT
parameters	er, may be entered in most fiel	ds to note
denotes fields whi	ch cannot be defaulted	
ESC - will cancel any ch session	anges made to this menu screen	during this
222.00		
5000.00		

Figure 7.1.35a: DENG Statement Help





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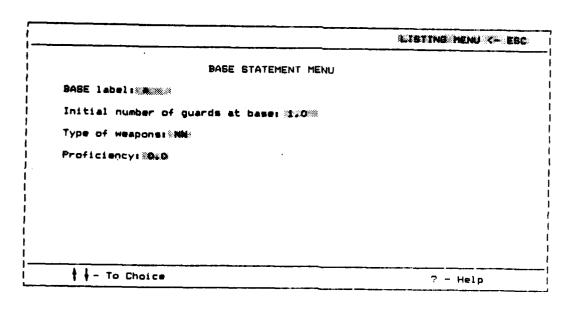


Figure 7.1.36: BASE Statement Menu

		CUIT (-) ESC
BAS	E ELEMENT HELP	
Definition	Options	Default
BASE label	4 characters max	**
Initial number of guards in the BASE	integer	1.0
Weapon type	HG-handgun SG-shotgun SA-sem -automatic SM-submachine gun FA-fully automatic NW-no weapon	HG
Proficiency	-100 to 100	0.0
[RETURN] - To Continue		MORE

Figure 7.1.36a: BASE Statement Help



Unlike the PENG, DENG, and BASE statements which may have multiple statements per submodel, only one of the engagement, combination, and objective statement can exist in a submodel. The combination statement is not required for all submodels. To supply these statements, select the statement type from the 'STATEMENT DEFINITION MENU'. A data input menu containing the defaults will be displayed. By typing [RETURN] in the last data field you exit the menu and return to the 'STATEMENT DEFINITION MENU'.

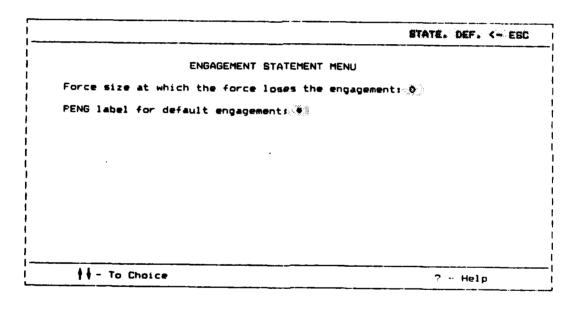


Figure 7.1.37: Engagement Statement Menu



		QUIT <- EBC
ENGAGEME	ENT STATEMENT HELP	
Definition	Options	Default
Force size at which the force loses the engagement	number or global variable	o
PENG label for default engagement	a defined FENG label	**
Pxx - where xx is a number, m parameters	may be entered in most field	s to note
#### - denotes fields which ca ESC - will cancel any changes session	unnot be defaulted s made to this menu screen do	uring this
[RETURN] - To Continue		DON

Figure 7.1.37a: Engagement Statement Help



	STATE, DEF. <- ESC
COMBINATION STATEMENT MENU	
orce combination:	
♦ ♦ - To Choice	? - Help

Figure 7.1.38: Combination Statement Menu

		QUIT <- ESC
COM	BINATIONS STATEMENT HELP	
Definition	Options	Default
List of force IDs	positive integers	**
parameters **** - denotes fields whic ESC - will cancel any cha session	ch cannot be defaulted anges made to this menu screen d	uring this
[RETURN] - To Continue		DON

Figure 7.1.38a: Combination Statement Help

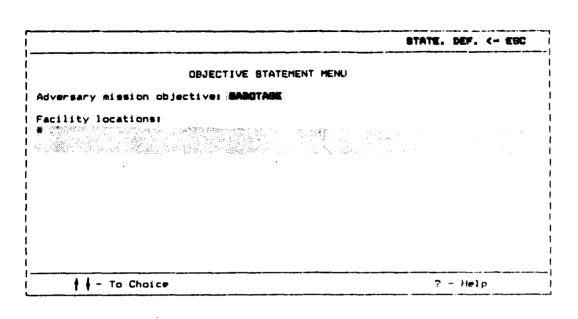


Figure 7.1.39: Objective Statement Menu

	<u>:</u>	QUIT <- ESC
OBJE	CTIVE STATEMENT HELP	
Definition	Options	Default
Mission objective	SABOTAGE or THEFT	SABOTAGE
List of facility locations that must be reached to satisfy objectives	defined facility location	**
Bxx — where xx is a number, m parameters	may be entered in most field	ds to note
#### - denotes fields which ca ESC - will cancel any changes session		during this
		<del></del>
[RETURN] - To Continue		DON

Figure 7.1.39a: Objective Statement Help



Once you have supplied all the statement information you may exit the statement definition mode by quitting from the 'STATEMENT DEFINITION MENU'.

If you have completed working with the submodel, you may leave from the graphical network builder by typing [X]. You will then be asked to supply a name under which the guard submodel will be saved. If you type [ESC] or enter quit in the name field, you will exit without saving any of the changes you have made. If you were editing an existing submodel, the name of that submodel would appear in the data field and, by typing [RETURN], you would save the updates to the submodel. If you supply a new submodel name, the updates will be stored under the new name and the old submodel will remain unchanged. If the new name is the same as an existing submodel, you may choose to re-enter the name or overwrite the old submodel.

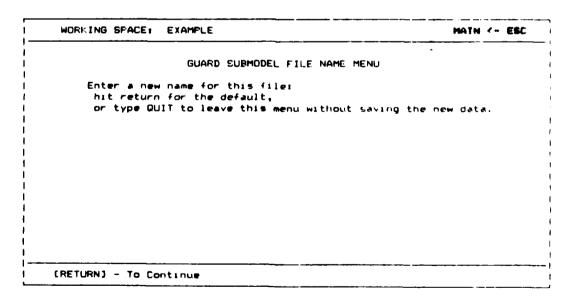
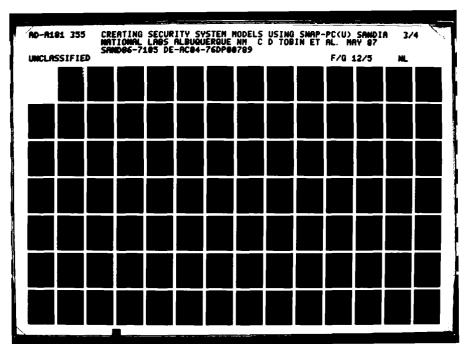


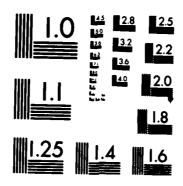
Figure 7.1.40: Guard Submodel File Name Menu

After you have entered the name for the submodel, you will be asked to supply a description to be associated with the submodel. A specific description will help identify what is contained in the submodel.

WORKING SPACE: EXAMPLE	MAIN <- ESC
GUARD BUTIMODEL FILL NAME MENU	
Enter a line of description for file: Or hit return to keep.	DAY_UNE
Daytime guard patrol procedures with one patrollic	ny force
(RETURN) - To Continue	

Figure 7.1.41: Guard Submodel File Name Description Menu





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

#### 7.2 Edit a Guard Submodel

To edit an existing submodel choose the edit option on the 'GUARD MENU'.

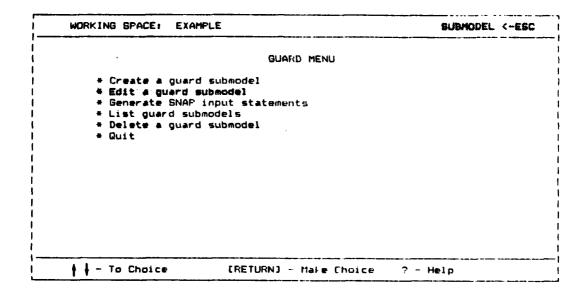


Figure 7.2.1: Guard Menu (Edit a guard submodel)





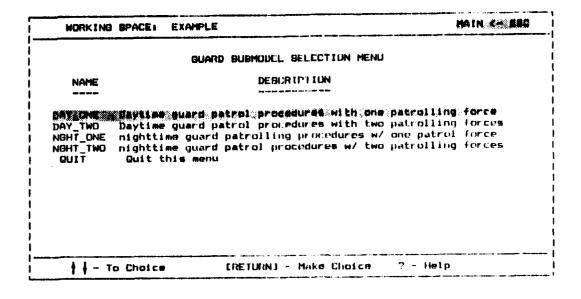


Figure 7.2.2: Guard Submodel Selection Menu

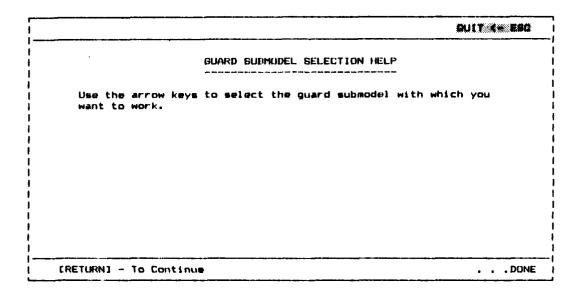


Figure 7.2.2a: Guard Submodel Selection Help



## 7.3 Generate SNAP Input Statements

You may generate the SNAP input statements by selecting the 'Generate SNAP input statements' option from the 'GUARD MENU'.

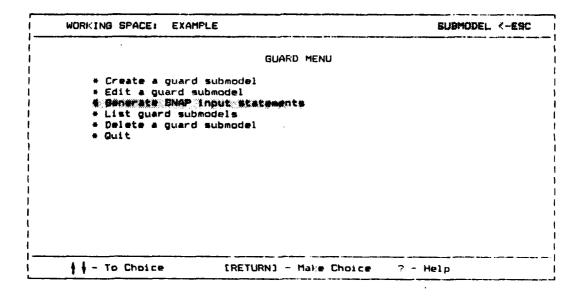


Figure 7.3.1: Guard Menu (Generate SNAP input statements)

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A submodel selection menu will appear which allows you to select the submodel for which you wish to generate statements.

The file that is generated ('name'.GSM) is located in your working space subdirectory.

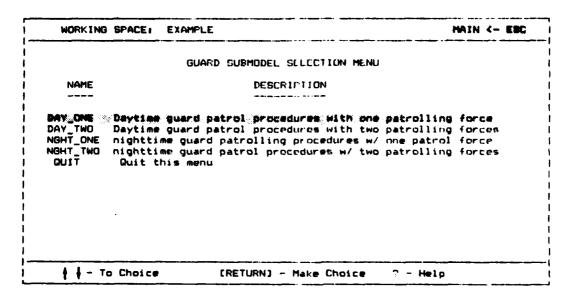


Figure 7.3.2: Guard Submodel Selection Menu

## 7.4 List Guard Submodels

To get a listing of all the guard submodels that currently exist, select the 'list' option.

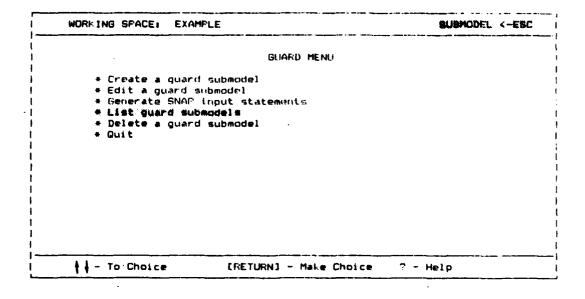


Figure 7.4.1: Guard Menu (List guard submodels)

WORKIN	G SPACE: EXAMPLE	MAIN (# ESC
	GUARD SUBMODEL DESCRIPTIONS	
NAME	DESCRIPTION	
DAY_DNE DAY_TWO NGHT_DNE NGHT_TWO	Daytime guard patrol procedures with one patrolling Daytime guard patrol procedures with two patrolling nighttime guard patrolling procedures w/ one patrol nighttime guard patrol procedures w/ two patrolling	forces force
[RETURN	1 - To Continue	DON

Figure 7.4.2: Guard Submodel Listing - Sample

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## 7.5 Delete a Guard Submodel



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If you wish to delete a submodel from your working space, you may select the delete option on the 'GUARD MENU'.

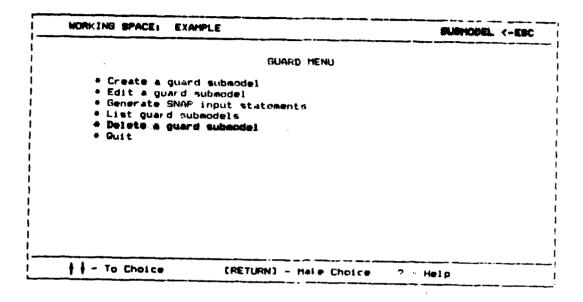


Figure 7.5.1: Guard Menu (Delete a guard submodel)



You may then select which submodel you wish to delete from a list of submodels. You will be asked to verify your selection.

WORKING	SPACE	EXAMPLE	MAIN <- ESC
		GUARD SUBMODEL DELETI	ON MENU
NAME		DESCRIPTION	
DAY_TWO NGHT_DNE NGHT_TWO	Daytime nightti	e guard patrolling proced e guard patrol procedures	with two patrolling forces
<b>↓ ↓</b> - To	Choice	[RETURN] - Make D	Choice ? - Help

Figure 7.5.2: Guard Submodel Deletion Menu

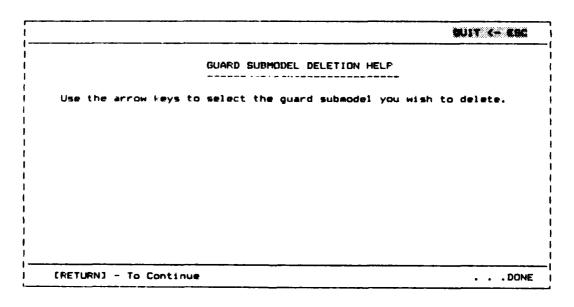


Figure 7.5.2a: Guard Submodel Deletion Help

### 7.6 Quit

CONTRACTOR RESPONSE

To quit working with the guard submodel, select the quit option.

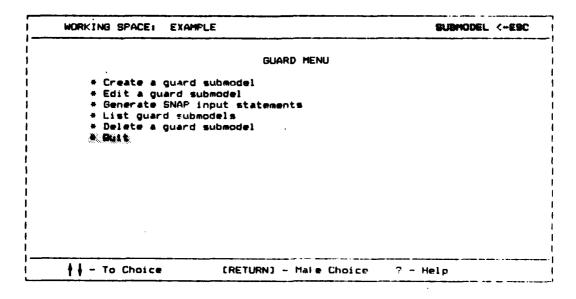


Figure 7.6.1: Guard Menu (Quit)



#### 8.0 GIVING USER2 CONTROL

To give User2 more flexibility during the analysis of his security system, you can allow him the option of altering some of the data elements in your SNAP model. To do this, you must parameterize your model and build the prompt query databases.

When you parameterize your model, you identify those data elements that User2 wants to study within the framework of the security system you have modeled. The prompt query databases provide the organization for the prompts and the allowed responses User2 will see when he resolves your model. For each parameterized submodel there is a Master Prompt Query Database and a Prompt Query Set Database. The Master Prompt Query Database defines the complete set of prompts that supports the submodel. The Prompt Query Set Database defines subsets of the prompts from which User2 can select to study particular aspects of the security system. These subsets are defined by you, perhaps at User2's request.

#### 8.1 Parameterizing Your Model

Figure 8.1.1 shows a data screen for a guard submodel that has been parameterized. The '@l' signifies that the 'Number of guards being allocated' field will be replaced by User2's response to prompt number 1 in the Master Prompt Query Database. In a like manner, '@124' is associated with prompt number 124.

NETWORK 4- BBC

#### ALLOCATE NODE MENU

Label: AL1 Comment:

Base label: BE

Number of guards being allocated: ##1

Maximum number of branches to be taken: 1

Do you wish to define branches? NO.

Enter SAVE to save current values, QUIT to exit without saving:

- To Choice

? - Help

Figure 8.1.1 Parameterized Allocate Node - Sample

The number of data elements that you may parameterize is limited to the number of digits you can place in a data field. For example, a data field five spaces wide could contain the parameter id, 09999. The parameter id's do not need to be in numeric order in your submodel and they do not have to be sequential. In other words, you can enter '0124' in one field and '01' in the next, and not parameterize any other data elements in your model. You may also parameterize mulitple data elements with the same parameter id. User2 will be prompted once per session, and his response will be used everywhere the parameter id is found in your model.

## 8.2 Building the Master Prompt Query Databases

The Master Prompt Query Database contains all of the prompts (questions), comments, and permitted responses that will be issued during a User2 prompt-query session. You need to build one Master

Prompt Query Database for every submodel that you parameterize. The naming convention follows: 'submodel name'.Xsq, where X is a 'g' for a guard submodel, 'a' for an adversary submodel, 'c' for a control submodel, and 'd' for an adversary detection submodel. The Master Prompt Query Database associated with the submodel containing the allocate node shown in Figure 8.1.1 is shown in Figure 8.2.1. The legend for Figure 8.2.1 identifies each of the fields of the Master Prompt Query Database.

```
e1a,1b:
 1°, "ENTER SIZE OF GUARD PATROL?",2<sup>d</sup>,1<sup>e</sup>,5<sup>f</sup>:
e2<sup>a</sup>,0<sup>b</sup>;
 0," HG - HANDGUNS",1;
 0," SG - SHOTGUNS",1;
 0," SA - SEMIAUTOMATICS",1;
 0°." SM - SUBMACHINEGUNS",1;
 0." FA - FULLY AUTOMATIC",1;
 0," NW - NO WEAPONS",1;
 O, "ENTER THE TYPE OF WEAPONS",1;
 3." USED BY GUARD PATROL FORCE ?", HGd, HG, SG, SA, SM, FA, NW;
e3.1:
 2<sup>C</sup>, "ENTER THE PROFICIENCY OF THE GUARD PATROL?",50.0<sup>d</sup>,0.0<sup>e</sup>,100.00<sup>f</sup>;
@4,1;
 0," HG - HANDGUNS",0;
 0," SG - SHOTGUNS",0;
 0," SA - SEMIAUTOMATICS",0;
 0," SM - SUBMACHINEGUNS",0;
 0," FA - FULLY AUTOMATIC",0;
 0," NW - NO WEAPONS",0h;
 0, "ENTER THE TYPE OF WEAPONS", 1";
 3<sup>C</sup>, " USED BY AUGMENTATION FORCE ?", HG, HG<sup>9</sup>, SG<sup>9</sup>, SA<sup>9</sup>, SM<sup>9</sup>, FA<sup>9</sup>, NW<sup>9</sup>;
```

Figure 8.2.1: Prompt Query File - Sample

### Legend (Figure 8.2.1)

- <u>a</u> Prompt number, corresponds to the submodel.
- <u>b</u> User key, identifies the question as being restricted to the long form only and not issued on the short form;

User key = 1, prompt is issued on long or short form,
User key = 0, prompt is issued on long form only.

Question type code, identifies the type of response that is expected (alpha, integer, or real); Question type code = 0, comment line which preceeds the prompt with which it should be issued, Question type code = 1, integer response expected, Question type code = 2, floating point response expected,

Question type code = 3, alpha response expected.

- <u>d</u> Prompt default value, used as the response if the prompt is not issued.
- e Lower bound of response, the minimum value that User2 can supply when responding to this prompt.
- <u>f</u> Upper bound of response, the maximum value that User2 can supply when responding to this prompt.
- q Alpha range of responses, the options from which User2 may choose to select.
- List print key identifies the comment print or noprint status when a response set is listed;
  List print key = 1, comment is printed,
  List print key = 0, comment is not printed.

The Master Prompt Query Database was designed to give you control over how the menu screen that will contain the prompts and permitted responses will appear to User2. Figure 8.2.2 shows what User2 will see when he is prompted for parameter id Number One. As you can see, you will want to limit the number of lines of comments that you write so as to keep the prompt on one page.

If User2 enters a number outside the permitted range, he will be told he is outside the range and prompted to enter another response. The alpha range of responses is displayed on a menu in such a way that User2 will use the arrow keys to move the cursor to the desired response.

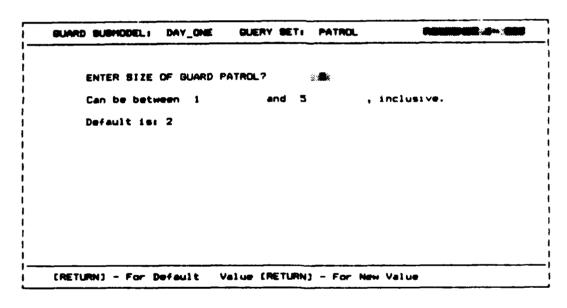


Figure 8.2.2: User2 Prompt Menu - Sample

The Master Prompt Query Database file can be created by any word processing package, such as WordStar TM. The format you need to use when you are building the file is best described as list-directed input. The individual fields on each line are separated



by commas, the total line may be up to 130 characters long, and the line must end with a semicolon.

Since you will test your model before you hand it over to User2, you will be able to do any fine-tuning of the prompt's appearance on the terminal screen. If the User2 Support Program cannot read the Master Prompt Query Database file, it will note where it stopped reading the file and write a debug message to the file, 'ERROR.RPT' on the User2 subdirectory. The process of building the User2 subdirectories and testing your submodel is explained in detail in Sections 9.0 and 10.0.

The vast majority of the options and restrictions on the format of the Master Prompt Query Database are explained in the legend accompanying Figure 8.2.1. The remainder of this section will deal with some of the finer points you may want to know.

The questions and comments (See Legend for Figure 8.2.1, item c) must be enclosed within double quotes and can be up to 60 characters long. You should type them exactly as you want them to appear, including question marks, periods, and other grammatical notation.

You may have as many as 10 alpha response choices, each one up to 8 characters long. However, since the line is limited to 130 characters, you will have to make some compromise between the two limits. You may try entering the query on your screen as a comment, thus allowing you to enter more alpha response choices on the line associated with the question code. Or, you may abbreviate the responses choices and explain the abbreviations in

the comments, as is shown in Figure 8.2.1. In the majority of instances, you will never be limited by these restrictions because most response choice lists are short and the choices are seldom longer than two character each.

The user key (See Legend for Figure 8.2.1, item b) can be used to isolate a set of prompts within the Master Prompt Query Database that is of special interest. During the query-response session, User2 will select to review either the long or the short form of the prompts. Under the short form, the prompts with user key equal to 0 will not be asked.

The list print key (item h) can be used to control the amount of detail that User2 sees when the responses are listed for review. After User2 finishes the query-response session in the User2 Support Program, he can list the comments, prompts, and responses to his microcomputer terminal. As shown in Figure 8.2.1, the comments are often repetitive. By setting the list print key equal to 0 on a comment line, you can inhibit the comment from being printed during the review.

### 8.3 Building the Prompt Query Set Databases

A Prompt Query Set Database identifies the sets of prompts for a single parameterized submodel from which User2 may choose. The naming convention follows: 'submodel name'.Xs\_, where X is 'g' for a guard submodel, 'c' for a control submodel, 'd' for an adversary detection submodel, and 'a' for an adversary submodel. Figure 8.3.1 shows the Prompt Query Set Database associated with

the submodel and Master Prompt Query Database shown in Figures 8.1.1 and 8.2.1.

PATROL<sup>a</sup> Sets the characteristics of the guard patrol.<sup>b</sup>

1,2,3,;<sup>c</sup>

TOTAL<sup>a</sup> Sets patrol characteristics and other parameters.<sup>b</sup>

1,2,3/4;

DEFAULT<sup>a</sup> Automatically select default parameters, if any exist.<sup>b</sup>

Figure 8.3.1: Prompt Query Set - Sample

Legend (Figure 8.3.1)

0:C

a - Name of the prompt query set.

b - Description of the prompt query set.

C - List of the prompt numbers that should be issued for a prompt query set. A prompt number of "0" signifies that the default values should be used and no prompts issued. The list of prompt numbers must end in a ";". The list of prompt numbers can be provided on more than one line, to signify continuation end the line with a "/".

The advantage of setting up numerous sets within the Prompt Query Set Database becomes greater as the number of prompts increases. By breaking the prompts into distinct groups you can allow User2 to study aspects of his security system, such as the patrol route or the advesary weaponry, without having to answer all of the questions each time he creates a response set. The unasked prompts will be defaulted when the model is resolved.

The format of the Prompt Query Set Database is explained in detail in the legend that accompanies Figure 8.3.1. Each line is limited to 80 characters. The line that contains the set name and description should be entered exactly as you want User2 to see it. The prompt numbers should be separated by commas and end with a semicolon (see the legend for details). Up to ten prompt query sets can be defined in the Prompt Query Set Database.

All guard, adversary, control, and adversary detection submodels must have an associated Prompt Query Set Database and Master Prompt Query Database. If the submodel has not been parameterized and therefore requires no prompts, the Master Prompt Query Database file is empty and the Prompt Query Set Database should show one prompt query set with the question list showing only a "0". This is similar to the last set shown in Figure 8.3.1.

### 9.0 SETTING UP THE SNAP-PC SUBDIRECTORY

Before you can test your model and before User2 can perform analyses with your model, you must set up a User2 work area or subdirectory and move the model into that subdirectory.

### 9.1 User2 Subdirectory Structure

The structure of the User2 Subdirectory is similar to the User1 working space. Figure 9.1.1 shows the SNAP-PC subdirectory tree structure using sample User2 subdirectories, U2\_user and U2\_exmpl.

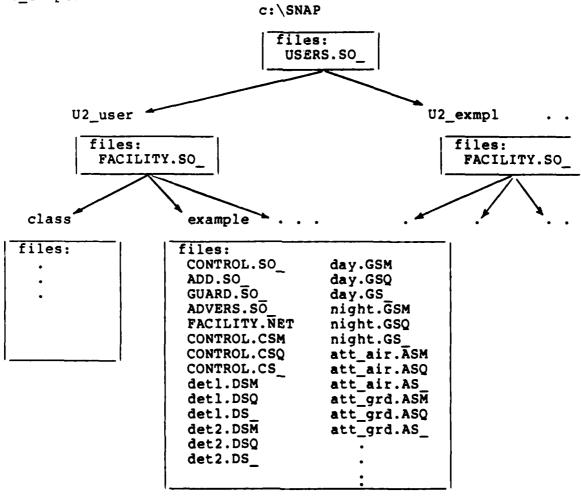


Figure 9.1.1: User2 Subdirectory Structure Sample

All of the characters in lower case are examples of subdirectory or file names that you will supply. In the main directory (C:\SNAP) the file USERS.SO\_ must contain a list of the User2 subdirectories and a description of each. For this example, USERS.SO\_ is shown in Figure 9.1.2. The contents of USERS.SO\_ are displayed when User2 is asked to select a user subdirectory. It can be created with a text editor such as WordStar TM.

user	User work space for SNAP-PC course May 1986
exmpl	Example work space
•	•
•	•
l	

Figure 9.1.2: File USERS.SO\_ Sample

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In a similar manner the file FACILITY.SO\_ under each User2 subdirectory, contains the list of facilities or models that reside under the subdirectory. Figure 9.1.3 displays an example of this file for user subdirectory U2\_user.

Figure 9.1.3: File FACILITY.SO\_ Sample

The facility, or model, subdirectory contains all the files and submodels necessary to perform the SNAP analyses. The file FACILITY.NET contains the SNAP statements representing your facility submodel. In this form it is ready to be joined with the other submodels and used in a SNAP analysis.

Those files in the subdirectory whose extension begins with 'C' correspond to the control submodel. CONTROL.CSM contains the SNAP input statement for the submodel, CONTROL.CSQ contains the Master Prompt Query Database for the submodel, and CONTROL.CS\_ contains the Frompt Query Set Database.

The same convention follows for the adversary detection, guard, and adversary submodels. Those files whose extension begins with 'D' correspond to the adversary detection submodels, those files whose extension begins with 'G' correspond to the guard submodels, and those files whose extension begins with 'A' correspond to the adversary submodels. Note that the adversary detection, guard, and adversary submodels are named by you when you create them using the Userl Support Program and that more than one of each may exist.

The files CONTROL.SO\_, ADD.SO\_, GUARD.SO\_ and ADVERS.SO\_ contain lists of the names and descriptions of the control, adversary detection, guard and adversary submodels that you created with the Userl Support Program. Since there is only one Control Submodel per model, the file CONTROL.SO\_ must be created but the others already exist in your working space. Figures 9.1.4 through 9.1.7 show examples of these files.



CONTROL Control Submodel for SNAP Example

Figure 9.1.4: File CONTROL.SO\_ Sample

det1	Detection using one sensor  Detection using three sensors
•	•

Figure 9.1.5: File ADD.SO\_ Sample

day_one	Daytime guard patrol procedures with one patrolling force
nght_one	Nighttime guard patrolling procedures with one patrol force
nght_two	Nighttime guard patrol procedures with two patrolling forces
day_two	Daytime guard patrol procedures with two patrolling forces
•	•
•	•
l	

Figure 9.1.6: File GUARD.SO\_ Sample

att_air	Adversary attack from the air
att_grd	Adversary attack from the ground
	•
	•
l	

Figure 9.1.7: File ADVERS.SO\_ Sample



### 9.2 Moving Your Model to a User2 Subdirectory

Your first steps to moving your model to a User2 Subdirectory is to create the necessary subdirectories in the form shown in Figure 9.1.1. If you are placing the model into a new user area, you will need to make the new user subdirectory and create or supplement the file USERS.SO\_ with the name of the new user subdirectory, i.e., user for subdirectory U2\_user. If you are placing the model in an existing User2 subdirectory, you will not need to create the subdirectory or alter the USERS.SO\_ file. The standard DOS command for making a subdirectory is [mkdir 'subdirectory name']. This should be done from within the parent directory. (After creating a subdirectory, it may be entered from the parent directory by typing [cd 'subdirectory name'].

If you are moving a new model into the User2 area, you will need to make the model subdirectory under the User2 subdirectory and augment or create the FACILITY.SO\_ file to reflect the new model. In the sample structure shown in Figure 9.1.1 one model subdirectory is EXAMPLE. If you are supplementing a model that already exists in the desired User2 Subdirectory, you will not need to create the new model subdirectory or alter the USERS.SO\_ or FACILITY.SO\_ files.

After you have created the necessary subdirectories you are ready to copy the submodels and supporting files into the facility subdirectory. This is done by using the DOS copy commands [copy 'old file name' 'new file name']. Typically, the copy command file name includes the path or subdirectory tree structure. You will find the submodels you created on the path C:\SNAP\USER1\XXX where XXX is the name of your Userl model working space. To

support animation you will also need the facility schematic in file 'FACILITY.FFB' to be placed in the model subdirectory. In addition, the Userl subdirectory contains the files ADD.SO\_, GUARD.SO\_ and ADVERS.SO\_. After copying them you may need to alter them to satisfy User2's needs. You will need to create CONTROL.SO\_ for User2. The Master Prompt Query Database files and Prompt Query Set Database files must also be placed in the facility subdirectory. You must create them using a text editor; hence, you may wish to create them in the facility subdirectory.

After structuring the subdirectories as described in Section 9.1 and placing the submodels in the facility subdirectory, you are ready to begin testing your model. Section 10.0 describes the testing process.

### 10.0 TESTING YOUR MODEL

To test your model you must first set up a User2 subdirectory. Section 9.0 gives you detailed instructions for setting up this subdirectory.

# 10.1 Executing the User2 Support Program

You must execute the User2 Support Program in order to test your model. To run your model, you must go through the process of selecting the submodels that you want to use. This process is detailed in the User2 manual, <a href="Evaluating Security Systems Using SNAP-PC">Evaluating Security Systems Using SNAP-PC</a> and will not be repeated here. If you follow the suggested modeling approach in Section 1.0, you will debug your model prior to parameterizing it. Therefore, when you select the submodels, you will only have the default prompt response option available when you select the prompt-query set for each submodel. This will eliminate the need to build a response set at this time. You may wish to reference Sections 8.0 and 9.0 concerning setting up prompt query files for a better understanding of the default prompt response option.

Once you have selected all four submodels, you may attempt to execute a run. When you select the execute option on the User2 'OPTION SELECTION MENU', you will be asked to supply information concerning the run. This includes tracing information which is vital to debugging models. For a complete explanation of the User2 Support Program you should reference the manual Evaluating Safeguards Systems Using SNAP-PC.

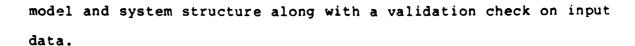
### 10.2 Debugging Your Model

When you begin the debugging process, it is a good idea to have the echo check option on the SNAP information statement in the Control Submodel set to (C)omplete. This will be helpful in debugging SNAP input errors. Input errors are associated with the SNAP statements, and if they occur, the simulation cannot begin. Appendix G in the SNAP User's Manual has a list of non-fatal and fatal input errors. After you have corrected the input errors, you should set the echo check option to (N)one.

Now that the input errors have been corrected, the execution of the simulation will be attempted. While it is executing, run time errors may be detected. A list of these errors is given in Appendix G of the SNAP User's Manual. If an error occurs, you may be able to determine from the error message what has caused the problem. However, more times than not, the problem will have to be investigated before the cause can be determined. The text trace and the animation are good tools to use to speed your investigation. These give you a time sequenced account of the events which occurred during the simulation prior to the time of failure.

### 10.3 Verification and Validation of Your Model

Once the model has been debugged, you must verify and validate the performance of the model. Verification consists of determining if the model executes on the computer as you intended. Validation is the task of determining if your model is a reasonable representation of your system. This involves a comparison of



# 10.4 Debugging Your Prompt Query Databases

After you have debugged your model, you may parameterize it for User2. Once the model is parameterized, you must again move it over to a User2 subdirectory to test. The testing includes debugging the prompt query databases you created when you parameterized the model. To test a prompt query database you should go through the User2 shell and try to create a response set. If there is an error in the Master Prompt Query Database or the Prompt Query Set Database, a message will be displayed on the screen at the time you select the prompt query database. To help in debugging these errors the file, 'ERROR.RPT' is created in the User2 subdirectory containing information describing the errors. Fix the error that is identified and try again to create a response set. Every prompt file you create should be tested in the same manner.

#### 11.0 PREPARING THE MODEL FOR USER2

Now that you have completed testing your model and feel comfortable with the analyses that can be done with it, you are ready to make it available for User2. In addition to installing the model in User2's subdirectory, you must provide enough information to insure effective analysis with the model.

### 11.1 Documenting the Model

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You should document the model to support a clear understanding of the activities and interactions in the system and, hence, support User2's efforts to draw accurate conclusions from the SNAP analysis. Each submodel should be supported with a list of modeling assumptions and a description of the model logic. Specifically, a discussion of the differences between submodels of the same type should be documented.

In addition, you should document the Master Prompt Query Databases and Prompt Query Set Databases. This should include a description of the use of each parameter and the implication of changing its value. The default values and the range of acceptable values should also be discussed. The prompt query sets should be documented to support User2's selection. This will insure User2's understanding the parameters for which he will be prompted and the default values that will be used for the prompts that are not issued.

Your documentation should also include an estimate of the minimum number of iterations of the simulation that should be executed and an estimate of the length of time it will take to run each iteration on an IBM PC AT. These topics will be discussed in Sections 11.2 and 11.3. Appendix C provides sample documentation for the model that has been shown throughout this manual.

# 11.2 Computing the Number of Iterations That Must Be Run

The number of iterations of the simulation is proportional to the level of accuracy or confidence you desire from the analysis. The more iterations that are executed, the greater the likelihood that the performance measures of the simulation (probability of system win) accurately reflect the modeled system. For instance, if the analysis predicts the probability of system win to be .90 after 20 iterations, you can be 54% confident that the true probability lies between .85 and .95. Whereas, if the analysis is performed with 100 iterations and the probability of system win is .90, you can be 90% confident that the true probability lies between .85 and .95. Table 11.2.1 shows the relationship between the number of iterations that are performed and the level of confidence that you can have in the performance measures of the analysis.

Table 11.2.1 Number of Iterations Versus Confidence Level

<u>Iterations</u>	Probability Of System Win	Confidence Interval On Probability Of System Win	Confidence <u>Level</u>
10	.1 .3 .5 .7	.0515 .2535 .4555 .6575 .8595	40% 28% 25% 28% 40%
20	.1 .3 .5 .7	.0515 .2535 .4555 .6575 .8595	54% 37% 35% 37% 54%
30	.1 .3 .5 .7	.0515 .2535 .4555 .6575 .8595	65% 45% 42% 45% 65%
40	.1 .3 .5 .7	.0515 .2535 .4555 .6575 .8595	69% 51% 46% 51% 69%
50	.1 .3 .5 .7	.0515 .2535 .4555 .6575 .8595	75% 55% 53% 55% 75%
60	.1 .3 .5 .7	.0515 .2535 .4555 .6575 .8595	80% 60% 55% 60% 80%
80	.1 .3 .5 .7	.0515 .2535 .4555 .6575 .8595	85% 67% 63% 67% 85%
100	.1 .3 .5 .7	.0515 .2535 .4555 .6575 .8595	90% 70% 69% 70% 90%

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Table 11.2.1 Number of Iterations versus Confidence Level (continued)

Iterations	Probability Of System Win	Confidence Interval On Probability Of System Win	Confidence Level
200	.1	.0515	98%
	.3	.2535	88%
	.5	.4555	85%
	.7	.6575	88%
	. 9	.8595	98%
300	.1	.0515	99.5%
• • •	.3	.2535	93.0%
	.5	.4555	91.5%
	.7	.6575	93.0%
	.9	.8595	99.5%

From your understanding of the system and the information supplied in Table 11.2.1, you should guide User2 in his decision of the number of iterations to perform.

# 11.3 Length of a Run

To assist User2 in his efforts to use his PC effectively, you should estimate the minimum and maximum time it will take to simulate one iteration of the SNAP model. At the time User2 starts a SNAP analysis, the numbers you have provided will be multiplied by the number of iterations he has requested to estimate the length of time the PC will be occupied executing the run. The time estimates are reported to the user and he is given the chance to abort the run and possibly execute it at another time. The minimum and maximum time estimates should be determined by clocking several runs of the model. After you have made the estimates, you should edit the 'general run information' in the control submodel to reflect these values.

#### **GLOSSARY**



- Adversary Detection Submodel The adversary detection submodel describes the sensor system present at the facility. This would include the sensors, logic points, and monitor point.
- Adversary Submodel The adversary submodel defines the attack process that the adversary forces will use to reach their objective.
- Case See Run.
- Control Submodel The control submodel defines and initializes the variables that are used in other portions of the model to control actions within the simulation.

  These variables are often referred to as global variables.
- Facility Submodel Typically, a facility environment consists of buildings, doorways, fences, open spaces, etc. The facility submodel defines the environment and the relationships between the pieces of the environment.
- Global Variable See Control Submodel.
- Guard Submodel The guard submodel outlines the guard actions during normal patrols and when the facility is under attack.
- Iteration An iteration is one execution of the simulation where only one set of random numbers is used. Typically, a SNAP analysis run includes several iterations.
- Master Prompt Query File The Master Prompt Query File is created by Userl and contains the complete set of prompts that may be issued during a query-response session for a submodel. The naming convention for the Master Prompt Query File is as follows: submodel name.Xsq, where X is 'g' for a guard submodel, 'a' for an adversary submodel, 'c' for a control submodel, and 'd' for an adversary detection submodel.
- Model A model is a description of the security system that is being analyzed. For the purpose of SNAP analysis a model will include a description of the facility (or environment) to be analyzed, descriptions of the possible guard and adversary movement, descriptions of the possible detection systems at the facility, and definition of the model controlling variables that will affect the SNAP analysis.
- Parameterization Parameterization is the process of building a model with missing data elements, that can be supplied at a later time by User2.



- Prompt Query Set A Prompt Query Set defines subsets of the queries in the Master Prompt Query File. The subsets are identified by name to User2 and defined by User1. The naming convention for the files associated with the Prompt Query Set is as follows: submodel name.Xs\_, where X is 'g' for a guard submodel, 'c' for a control submodel, 'a' for an adversary submodel, and 'd' for an adversary detection submodel.
- Prompt Response Set The Prompt Response Set contains the responses that User2 has given during a query-response session.
- Run A run is an execution of a SNAP analysis using one of each of the five submodels.
- Sensitivity Analysis Sensitivity Analysis is the process of evaluating the sensitivity of the system's performance to changes to procedures, task times, etc. This is done by executing the SNAP analysis under a variety of responses to the prompts, usually varying only one parameter at a time.
- SNAP SNAP (Safeguards Network Analysis Procedure) is a simulation based analysis technique used to evaluate fixed site security systems.
- SNAP-PC SNAP-PC is a combination of programs useable on IBM-PC compatible micro-computers. These programs include SNAP, a Userl interface program and a User2 interface program. The Userl interface program supports the development of SNAP models. The User2 interface program supports the analysis of SNAP models.
- Submodels Submodels are components of a model. Five different types of submodels comprise a SNAP-PC model. They are the facility submodel, the control submodel, adversary detection submodels, guard submodels, and adversary submodels. A SNAP analysis or run is comprised of one of each of the five submodels.
- Userl Userl is a SNAP-PC user who is responsible for building models and developing Prompt Query Sets for the models he has developed.
- User2 User2 is a SNAP-PC user who is interested in performing SNAP analyses on a security system.
- User2 Subdirectory The User2 Subdirectory is the directory that has been defined for a specific user. Typically it will be named to correspond to the user's name, i.e., Mark, Smith. A User2 subdirectory can contain one or more models. The User2 subdirectories were established so that a user can work with a model without disturbing the work of other users with access to the same micro-computer.

Working Space - A working space is the area that is used by Userl to build and define a model. Within the computer, the working space is a subdirectory. Each working space contains only one facility submodel and only one control submodel and any number of guard, adversary and adversary detection submodels. Typically the working space name correseponds to the name of the facility.





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# APPENDIX A

Nodes and Statements for Each Submodel



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### NODES AND STATEMENTS FOR EACH SUBMODEL

### Control Submodel

General Run Information Statement - one required

Parameter Statements - as many as needed

Global Variable Statements - as many as needed

Global Flag Statements - as many as needed

Force Flag Statements - as many as needed

Macro Statements - as many as needed

Timer Statements - as many as needed

# Facility Submodel

Space Nodes - as many as needed

Barrier Nodes - as many as needed

Target Nodes - as many as needed

# Adversary Detection Device Submodel

Sensor Nodes - as many as needed

Logic Nodes - as many as needed

Monitor Nodes - as many as needed

### Guard Submodel

Engagement Statements - one required

Combinations Statements - one, as required

BASE Statements - as many as needed

PENG Statements - as many as needed

in specific order

DENG Statements - as many as needed

Enter Nodes - as many as needed

Allocate Nodes - as many as needed

Wait Nodes

Task Nodes

Signal Nodes

Exit Nodes

Branch Types

Regular

Decision

Probabilistic

# - as many as needed

# Adversary Submodel

Engagement Statement

Combinations Statement

Objective Statement

PENG Statements

DENG Statements

Enter Nodes

Wait Nodes

Task Nodes

Signal Nodes

Exit Nodes

Branch Types

Regular

Decision

Probabilistic

- one required

- one, as required

- one required

 as many as needed in specific order

- as many as needed

# APPENDIX B

Modeling Limited Ammunition Supply

### MODELING LIMITED AMMUNITION SUPPLY

Modeling limited ammunition supply has been identified as an immediate need of the current SNAP-PC users. This is not explicitly designed into SNAP but can be modeled in two fashions with the PENG and DENG statements. Using one approach, the force that has exhausted their ammunition supply will be fired upon at an increased rate; in the other, they will be fired upon at the same rate as when they are loading their weapons.

For both approaches one or several PENG statements must be used to represent the period of time that the force has ammunition followed by a PENG statement defining the length of time the force is without ammunition. You can model a scenario where a force runs out of ammunition by specifying a length of time greater than the length of the simulation run. A shorter duration can be used to model getting ammunition from casualties or another source.

The DENG statement associated with the lack of ammunition time period should either show a suppression status of 'yes' or a percent time delay of '100'. If a suppression status of 'yes' is specified, the force will not fire during the time period and the opposing force will fire at an increased rate. If the percent time delay is '100', the force will not fire and their exposure is the same as their exposure while loading.

With either approach, you will be able to study the effects of limited ammunition supply. This aspect becomes increasingly important as the length of individual engagements or the number of engagements increases.



# APPENDIX C

Documentation of Sample Model



### DOCUMENTATION OF SAMPLE MODEL

This model is based on a SNAP example first presented in Chapter IX of the SNAP User's Manual. The model includes a small facility with only one building and one target. The model includes two alternative sensor submodels, four guard submodels and two adversary attack submodels. Preliminary analysis with this model shows that at least 100 iterations should be executed to insure accurate interpretation of the model outputs.

# Facility Submodel

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The facility consists of a building with one entrance surrounded by a patrolled area. Figure C.1 shows the facility submodel. Space nodes Il through I5 represent the areas of interior patrols. Space nodes Ol through O5 represent the areas of the exterior patrols; barrier Dl is the doorway to the building.

Target node TAR1 represents the target with a sensor, S2. Exterior space nodes Ol and O3 also have sensors. Space and barrier nodes LADR, ROOF, and CUT are used to describe the path an adversary will take as he tries to reach the target.





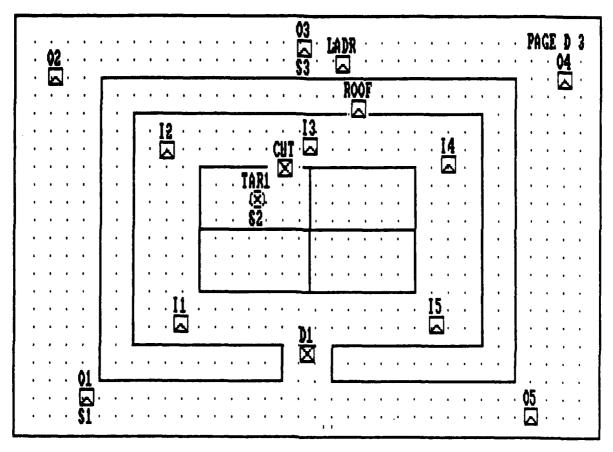


Figure C.1: Facility Submodel



# Control Submodel



The control submodel defines the data distributions that are used by the model and the global variables. The control submodel was not parameterized and, therefore, has no prompts. The data that is defined in the control submodel will be discussed in the following sections.

# Adversary Detection Submodel

Two adversary detection submodels have been developed to support this model. The first is <u>DET1</u> and includes only one active sensor (S2) and one monitor point (M1). Figure C.2 shows this adversary detection submodel. Sensor nodes S1 and S3 are included in the diagram, but do not affect the simulation of the model. The second adversary detection submodel, <u>DET2</u>, includes two additional active sensors on exterior space nodes O1 and O3. Figure C.3 shows this adversary detection submodel.





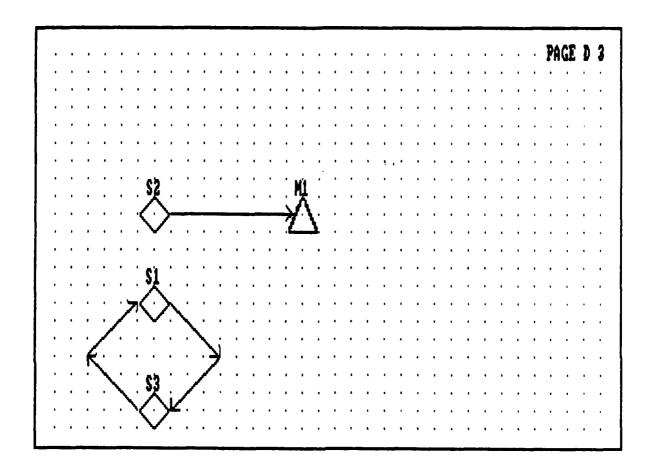


Figure C.2: Adversary Detection Submodel - DET1



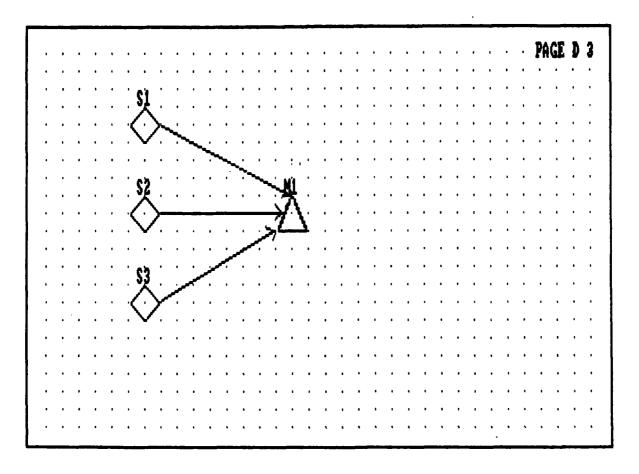


Figure C.3: Adversary Detection Submodel - DET2



Associated with both submodels are prompt query sets allowing you to define the probability of sensor detection and the signal persistence as permanent or temporary. The default probability of detection for all sensors is .95 and the default signal persistence for all sensors is permanent.

Submodel DET1 has only two prompt query sets: SENSORS or DEFAULT. SENSORS prompts for both the probability of detection and the signal persistence for sensor S2. Selecting DEFAULT causes the default responses for both prompts to be used to resolve the model.

Submodel DET2 has four prompt query sets: SENSORS, EXTER, INTER or DEFAULT. SENSORS issues prompts for all three sensors. EXTER prompts only for information associated with sensors S1 and S3. INTER prompts only for information for sensor S2. DEFAULT does not issue any prompts and uses the default values for all responses.

# Guard Submodel



Four guard submodels have been developed to support the analysis. In general the guards patrol the inside and outside of the building. Normal interior patrolling is accomplished by traveling through spaces II through I5 in either a clockwise or counterclockwise direction (chosen randomly). The time to travel through each space is triangularly distributed with a minimum of one, mode of 1.5, and maximum of 2.5. If adversaries are detected, the guards double their rate of travel. Normal exterior patrolling is accomplished by traveling through spaces OI through O5 in either a clockwise or counterclockwise direction (chosen randomly). The time to travel through each space is triangularly distributed with a minimum of two, mode of 2.5, and maximum of 3.5. If adversaries are detected, the guards double their rate of travel.

Guard submodel <u>DAY ONE</u> includes a single patrol that patrols both the exterior and interior of the building. In addition, if a sensor is triggered, the guard force hears it whether they are on interior or exterior patrol. The prompts define the number in the patrolling force, the weaponry they carry and their proficiency. In addition, the prompts define the weaponry used by the augmentation force. Table C.1 shows the default values for each prompt.



# Table C.1

# Guard Submodel DAY\_ONE

# Prompts

Prompt	<u>Default Value</u>
Size of Patrol	2
Patrol Weaponry	Handguns
Patrol Proficiency	50%
Augmentation Force Weaponry	Handguns

Three prompt query sets allow selection of the patrol prompts, excluding augmentation force weaponry; all prompts; or a default set, issuing no prompts.

Guard submodel <u>DAY TWO</u> includes separate interior and exterior patrols. As with DAY\_ONE interior and exterior patrols are alerted when a sensor is triggered. Table C.2 defines the prompts and their default values.



# Guard Submodel DAY\_TWO

### Prompts

Prompt	Defualt Value
Size of Interior Patrol	1
Size of Exterior Patrol	1
Patrol Weaponry	Handguns
Patrol Proficiency	50%
Augmentation Force Weaponry	Handguns

Three prompt query sets allow selection of the patrol prompts, excluding augmentation force weaponry; all prompts; or a default set, issuing no prompts.

Guard submodel <u>NGHT ONE</u>, like DAY\_ONE allows for only one guard force to patrol both the interior and exterior. NGHT\_ONE varies from DAY\_ONE in the manner patrols are alerted when a sensor is triggered. Only an interior patrol is alerted by a sensor triggering. The prompts and prompt query set associated with NGHT\_ONE are identical to those defined for DAY ONE.

Guard submodel <u>NGHT TWO</u>, like DAY\_TWO allows for two guard forces. It varies from DAY\_TWO in that only the interior patrol is alerted when a sensor it triggered. The prompts and prompt query set associated with NGHT\_TWO are identical to those defined for DAY\_TWO.



# Adversary Submodel

The adversary's objective is to sabotage the target. Two adversary submodels have been defined to support this objective. In both cases the adversary cuts through the roof of the building taking a fixed amount of time based on a uniform distribution with a minimum of four minutes and a maximum of nine minutes. After cutting through the roof, they sabotage the target.

Adversary submodel <u>ATT GRD</u> begins with three adversaries entering at space node O3 and climbing a fire escape ladder to the roof one at a time. The time that is required to cross space O3 is one minute. The time that each adversary takes to climb the ladder is normally distributed with a mean of .333 minutes and a standard deviation of .1 minutes. If guards appear while they are climbing the ladder, they will engage the guard force. Table C.3 shows the prompts and default values associated with this submodel.



# Adversary Submodel ATT\_GRD

# Prompts

Prompt	<u>Defualt</u>
Adversary Weaponry	Handguns
Adversary Proficiency	50%
Time to Sabotage Target	6 minutes

Four prompt query sets have been defined. The first,
ATTACK, supports prompts for adversary weaponry and proficiency.
Prompt query set MISSION prompts for only the sabotage time.
TOTAL issues all three prompts. DEFAULT issues no prompts and supplies default values for all prompts.

Adversary submodel <u>ATT AIR</u> assumes the adversaries are attacking the site from the air and do not need to climb the ladder. Hence, they are immediately placed on the roof. The prompts and prompt query sets defined for ATT\_GRD are also used for ATT\_AIR.

# APPENDIX D

Complete Model - Example

# COMPLETE MODEL - EXAMPLE



This appendix contains a complete copy of the model that has been used as an example throughout this manual. In addition, you will find all of the master prompt query databases and prompt query set databases. All of the information shown reflect the default responses to the queries.

# Facility Submodel

Figure D.1 shows the graphical facility submodel. Figure D.2 displays the facility submodel echo report providing detailed information on the submodel.

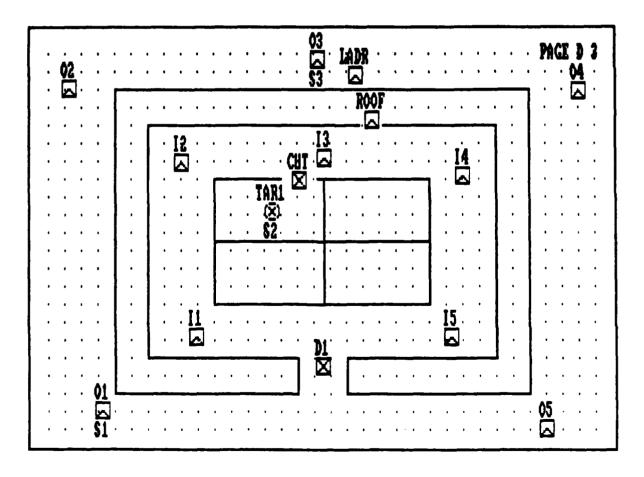


Figure D.1: Facility Submodel



# \*\* FACILITY LOCATIONS \*\*

NODE LABEL	STATISTICS COLLECTION OPTION	NODE TYPE	ACTIVE / DISABLED	ADJACENT NODES	ADD LABELS
D1	NO	BARRIER	ACT		
CUT	NO	BARRIER	ACT		
ROOF	NO	SPACE			
LADR	NO	SPACE			
05	NO	SPACE			
04	NO	SPACE			
03	ND	SPACE			<b>S</b> 3
02	NO .	SPACE			
01	NO	SPACE			S1
13	NO	SPACE			
I 4	NO	SPACE			
15	NO	SPACE			
I 1	NO	SPACE			
12	NO	SPACE			
TAR1	NO	TARGET			S2

Figure D.2: Facility Submodel Echo Report

# Control Submodel

Figure D.3 displays the echo report of the control submodel. Figure D.4 shows the prompt query set database for the control submodel.

**	****	*****	****	****	*******	********	***
•	ECHO	CHECK	FOR '	THE	CONTROL	SUBMODEL	#
**	****	*****	****	****	*******	*******	***

#### \*\* PARAMETER SETS \*\*

		PARA	METER				
SET NUMBER	ONE	TWO	THREE	FOUR			
4	1.000	1.500	2.50	.000			
5	.500	.750	1.25	.000			
6	. 333	.000	.100E+21	.100			
8	2.000	2.500	3.50	.000			
•	1 000	4 556	4 40	200			

#### \*\* STATUS VARIABLES \*\*

STATUS LABEL	VARIABLE TYPE	INITIAL VALUE		
IPI	GLOBAL VAR.	4.000		
OPI	GLOBAL VAR.	8.000		
ALRM	REGULAR FLAG	DISABLED		
FI	FORCE FLAG	DISABLED		

#### \*\* TIMER CARDS \*\*

TIMER	ALPHANUMERIC			
LABEL	OPTION	IDENTIFIER		
TT1	TSM	TIM FRM ALRM TO ENG		

# \*\* MACRO CARDS \*\*

MACRO	DOB					
LABEL	LABEL ACTIONS					
MAC1	SET(IPI , BET(OPI ,	5.0001 9.0001				
MAC2	MTT1	7.000/				
	AALRM	,				

Figure D.3: Control Submodel Echo Report

DEFAULT Automatically select default parameters, if any exist. 0;

Figure D.4: Control Submodel Prompt Query Set Database

# Adversary Detection Submodel

Figures D.5 through D.12 display the graphical diagrams for both adversary detection submodels, DET1 and DET2. They also show the associated echo reports, prompt query set databases, and master prompt query databases.

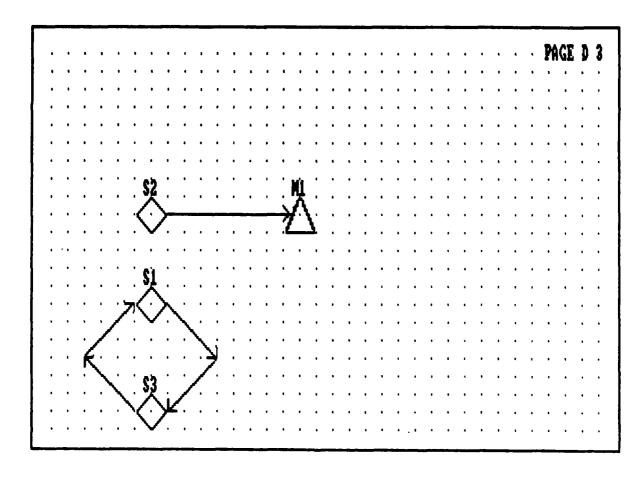


Figure D.5: Adversary Detection Submodel DET1

# \*\* ADVERSARY DETECTION DEVICES \*\*

ADD LABEL	ADD TYPE	TEMPORARY/ FERMANENT	PROBABILITY OF DETECTION	INFORMATION RECEIVER
S3	SENSOR	PERM	1.000	S1
S1	SENSOR	PERM	1.000	S3
<b>S</b> 2	SENSOR	PERM	.950	M1
M1	MONITOR			W1

Figure D.6: Adversary Detection Submodel DET1 Echo Report

SENSORS Sets the sensor specifications.

1,2;

DEFAULT Automatically select default parameters, if any exist.

0;

Figure D.7: Adversary Detection Submodel DET1
Prompt Query Set Database

Contract Contraction Contraction

```
@1,1;
    0,"ENTER THE PROBABILITY OF",1;
    2," DETECTION FOR SENSOR S2?",.95,.40,1.0;
@2,1;
    0,"ENTER THE SIGNAL PERSISTENCE",1;
    3," OF SENSOR S2 ?",PER,PER,TEM;
```

Figure D.8: Adversary Detection Submodel DET1
Master Prompt Query Database

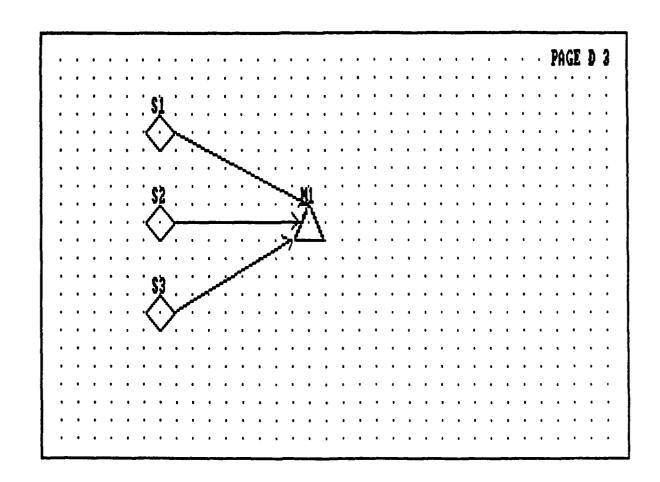


Figure D.9: Adversary Detection Submodel DET2 235





# \*\* ADVERSARY DETECTION DEVICES \*\*

ADD	ADD	TEMPORARY/	PROBABILITY OF DETECTION	INFORMATION
LABEL	TYPE	PERMANENT		RECEIVER
S1 S3 S2 M1	SENSOR SENSOR SENSOR MONITOR	PERM PERM PERM	.950 .950 .950	M1 M1 M1 W1

Figure D.10: Adversary Detection Submodel DET2
Echo Report

```
SENSORS Sets all sensor specifications.

1,2,3,4,5,6;

EXTER Set exterior sensor specifications.

3,4,5,6;

INTER Set interior sensor specifications.

1,2;

DEFAULT Automatically select default parameters, if any exist.

0;
```

Figure D.11: Adversary Detection Submodel DET2
Prompt Query Set Database



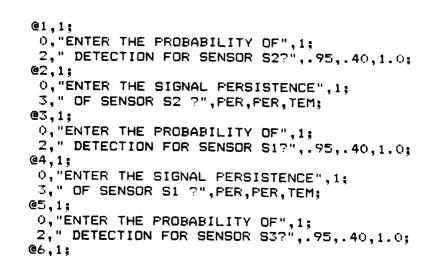


Figure Dl2: Adversary Detection Submodel DET2
Master Prompt Query Database

0."ENTER THE SIGNAL PERSISTENCE".1;
3." OF SENSOR S3 0",PER,PER,TEM;

# Guard Submodel



Figures D.13 throught D.28 display the four guard submodels.

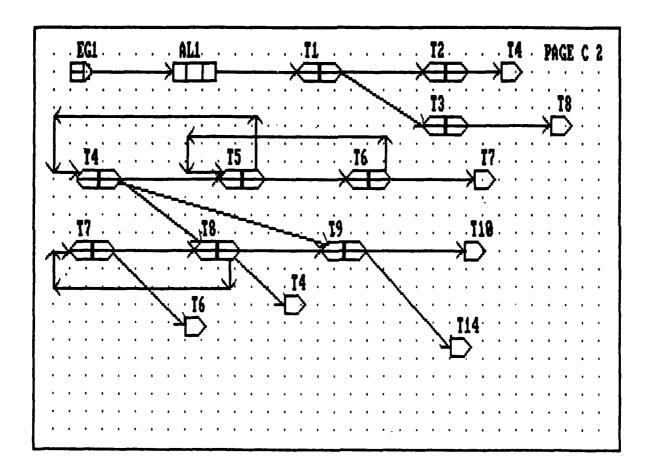


Figure D.13a: Guard Submodel DAY\_ONE





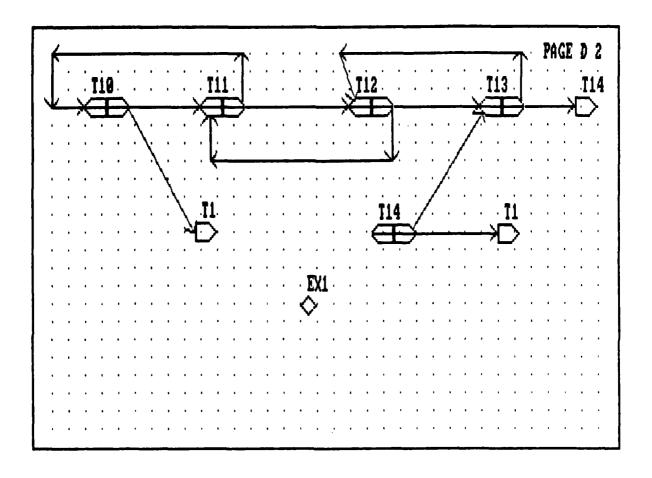


Figure D.13b: Guard Submodel DAY\_ONE (continued)



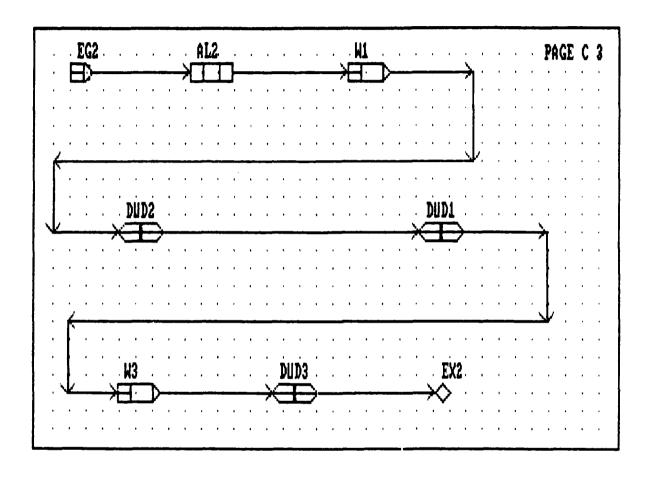


Figure D.13c: Guard Submodel DAY\_ONE (continued)



\* ECHO CHECK FOR THE GUARD SUBMODEL +

\*\* GUARD ENGAGEMENT CARD \*\*

TERMINATION CONDITION DEFAULT FEBL.

SIZE.LE, .0 FG1

\*\* GUARD FENG CARDS \*\*

PENG DENG LABEL LABEL TINC VALUE PG1 DG1 1.00 PG2 DG2 1.00

\*\* GUARD DENG CARDS \*\*

PERCENT EXFOSURE EXFOSURE DENG SELF SUPPRES+ WHILE TIME SELF SUPPRI RELOADING DELAY POSTURE ILLUMINATION SION WHILE TACTIC LABEL POSTURE FIRING DG1 CROUCHING 50.0 30.0 o. 50.0 NO ASSAULT pg2 STANDING 30.0 100.0 NO ASSAUL T

\*\* GUARD BASE NODES \*\*

LABEL	GUARDS	WEAFON TYPE	PROFICIENCY
B1 B2	5.	FISTOLS FISTOLS	50.0

#### \*\* GUARD ENTER NUDES \*\*

NODE LABEL	TIME OF ARRIVAL	FACILITY LOCATION	MXTAL
EG1	.00	D1	1
EG2	.00	***	1

STATE SANCASSON CONTRACTOR SANCASON (NATARAN CONTRACTOR)

#### \*\* GUARD ALLOCATE NODES \*\*

NODE	BASE		
LABEL	LABEL	MXTAK	SIZE
AL 1	B1	1	2.
AL2	<b>B</b> 2	1	0.

Figure D.14a: Guard Submodel DAY ONE Echo Report



# \*\* GUARD TASK NODES \*\*

TASK LABEL	FACIL NODE	MODE	TASK	TIME	DISTRIBUTION	DOB 08	ESIGNATION	EL.HL	SI.BL MXTA
τ1	D1	PATR		CON (	.300)				1
T2	****			CON (	.000)	ACT	(FI )		1
T 4	I 1			TRI	(1FI ,1)				1
T5	12			TRI	(IPI ,1)				1
T6	13			TRI	(IPI ,1)			EX1	1
T7	I 4			TELL	(IFI ,1)				1
TB	15			TRI	(IFI ,1)				1
T7	D1			CON(	.300)				1
T14	05			TECL	(OPI ,1)				1
T13	04			TRI	(OPI ,1)				1
T12	03			TRI	(OFI ,1)			EX1	1
T11	02			TRI	(OFI ,1)				1
T10	01			TRI	(OPI ,1)				i
13	***			CONC	.000)	210	(F. I )		1
DUD2	****			CON (	, ()()()	CALL	_(MACC)		1
1 QUQ	****			CONT	,000)	CALL	_ (MAC.1)		1
DUD3	****			CONC	.000)	RECO	D(TT1 )		1

TASK	ENGA	SEMENT POIN	TEF'S
LABEL	FLBLE	DISTANCE	FEPL
T6	TAR1	4,000	₽GI
T12	03	10,000	FG1
	LADR	12.000	FG1
	ROOF	20,000	FG1

# \*\* GUARD WAIT NODES \*\*

NODE LABEL	TRIGGERS	MERGE/ TRANSFER ELBL SLEL MXTAI	
W1 W3	ADD M1 TRIGGERED ENGAGEMENT AT TAR1	1	

\*\* GUARD SIGNAL NODES \*\*

NODE LABEL SIGNAL OPTION MXTAI

Figure D.14b: Guard Submodel DAY\_ONE Echo Report (continued)

PATROL Sets the characteristics of the guard patrol.

1,2,3;
TOTAL Sets patrol characteristics and other parameters.

1,2,3/
4;
DEFAULT Automatically select default parameters, if any exist.

0;

```
Figure D.15: Guard Submodel DAY_ONE Prompt Query Set
               Database
@1,1;
 1, "ENTER SIZE OF GUARD PATROL?", 2, 1, 5;
@2,0;
 0,"
     HG - HANDGUNS",1;
 0,"
     SG - SHOTGUNS",1:
 0,"
     SA - SEMIAUTOMATICS",1;
0,"
     SM - SUBMACHINEGUNS",1;
      FA - FULLY AUTOMATIC",1;
 O." NW - NO WEAFONS",1;
 O, "ENTER THE TYPE OF WEAPONS",1;
 3," USED BY GUARD FATROL FORCE ?", HG, HG, SG, SA, SM, FA, NW;
@3,1;
 2, "ENTER THE PROFICENCY OF THE GUARD PATROL?", 50.0,0.0,100.0;
@4,1;
 0,"
      HG - HANDGUNS", 0:
      SG - SHOTGUNS",0:
 0,"
      SA - SEMIAUTOMATICS", 0;
 0,"
      SM - SUBMACHINEGUNS", 0:
 0,"
      FA - FULLY AUTOMATIC", O:
      NW - NO WEAFONS", O:
 O, "ENTER THE TYPE OF WEAPONS", 1;
 3," USED BY AUGMENTATION FORCE ?", HG, HG, SG, SA, SM, FA, NW;
 Figure D.16:
               Guard Submodel DAY_ONE Master Prompt Query
```

Database



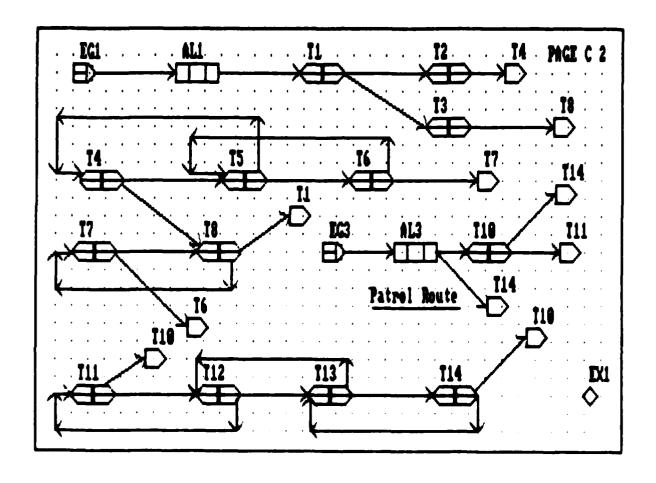


Figure D.17a: Guard Submodel DAY\_TWO





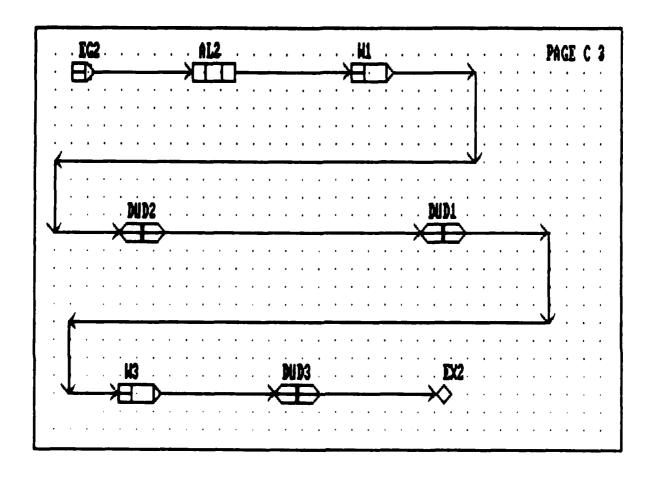


Figure D.17b: Guard Submodel DAY\_TWO (continued)





and the second and the second second

ECHO CHECK FOR THE GUARD SUBMODEL

\*\* GUARD ENGAGEMENT CARD \*\*

TERMINATION CONDITION DEFAULT PEBL

\*\* GUARD FENG CARDS \*\*

PENG DENG
LABEL LABEL TINC VALUE
FG1 DG1 1.00
PG2 DG2 1.00

\*\* GUARD DENG CARDS \*\*

#### \*\* GUARD BASE NODES \*\*

NODE	NUMBER OF GUARDS	WEAPON TYPE	PROFICIENCY
B1	5.	PISTOLS	50.0
B2	1.	PISTOLS	٠.

#### \*\* GUARD ENTER NODES \*\*

NODE LABEL	TIME OF ARRIVAL	FACILITY LOCATION	MXTAK	
EG1	.00	D1	1	
EG3	.00	01	1	
EG2	.00	****	1	

# \*\* GUARD ALLOCATE NODES \*\*

NODE BASE LABEL LABEL		MXTAK	SIZE	
AL1	B1	1	1.	
AL3	<b>B</b> 1	1	1.	
AL2	82	1	٥.	

Figure D.18a: Guard Submodel DAY\_TWO Echo Report



##	GUARD	TASK NODES	##

TASK LABEL	FACIL NODE	MODE	TASK	TIME	DISTRIBUTION	DOB D	ESIGN	MATION	ELBL	SLBL MXTAK
Ti	D1	PATR		CON(	.300)					1
T2	***			CON	.000)	ACT	(FI	)		1
T4	I 1			TRI	(IPI ,1)					1
T5	12			TRI	(IPI ,1)					1
T6	13			TRI	(IPI ,i)				EX1	1
T7	14			TRI	(IPI ,1)					1
TB	15			TRI	(IPI (I)					1
T3	****			CON	.000)	DIS	(FI	)		1
T14	05			TRI	(OPI ,1)					1
T10	01			TRI	(OPI .1)					1
T11	02			TRI	(OPI 1)					1
T12	03			TRI	(OPI ,1)				EX1	1
T13	04			TRI	(OPI ,1)					1
DUD2	***			CON(	.000)	CAL	L (MAC	(2)		1
DUD 1	***			CON	.000)	CAL	L (MAC	21)		1
DUD3	****			CON(	.000)	REC	O (TT	L <b>)</b>		1

TASK ENGAGEMENT POINTE					
LABEL	FLBLE	DISTANCE	PEBL		
T6	TAR1	4.000	FG2		
T12	03	10.000	FG1		
	LADR	12,000	PG1		
	ROOF	20.000	PG1		

\*\* GUARD WAIT NODES \*\*

NODE LABEL	TRIGGERS	 ENGAGEMENT POINTERS KTAK FLBLE DISTANCE PEBL
	ADD M1 TRIGGERED ENGAGEMENT AT TAR1	1 1

\*\* GUARD SIGNAL NODES \*\*

NODE

LABEL SIGNAL OPTION MXTAK

NO SIGNAL NODES

Figure D.18b: Guard Submodel DAY\_TWO (continued)



```
PATROL
          Sets the characteristics of the guard patrol.
1,2,3,5
TOTAL
          Sets patrol characteristics and other parameters.
1,2,3/
4,5;
DEFAULT
          Automatically select default parameters, if any exist.
0:
                Guard Submodel DAY_TWO Prompt Query Set
  Figure D.19:
                Database
 @1,1;
  1, "ENTER SIZE OF INTERIOR GUARD PATROL?", 1, 1, 5;
 e2,0;
```

```
0,"
     HG - HANDGUNS",1;
ο, "
     SG - SHOTGUNS",1:
     SA - SEMIAUTOMATICS",1;
ο,"
     SM - SUBMACHINEGUNS",1;
ο,"
     FA - FULLY AUTOMATIC",1;
O," NW - NO WEAPONS",1;
O, "ENTER THE TYPE OF WEAPONS", 1:
3," USED BY GUARD PATROL FORCE ?", HG, HG, SG, SA, SM, FA, NW;
@3.1;
2, "ENTER THE PROFICENCY OF THE GUARD PATROL?",50.0,0.0,100.0;
@4,1;
0,"
     HG - HANDGUNS", 0;
0,"
     SG - SHOTGUNS",0;
0,"
     SA - SEMIAUTOMATICS",0;
0,"
     SM - SUBMACHINEGUNS", 0;
O," FA - FULLY AUTOMATIC", O:
O," NW - NO WEAPONS", O:
O, "ENTER THE TYPE OF WEAPONS",1:
3," USED BY AUGMENTATION FORCE ?", HG, HG, SG, SA, SM, FA, NW;
Q5,1;
 1," ENTER SIZE OF EXTERIOR GUARD PATROL?",1,1,5;
```

Figure D.20: Guard Submodel DAY\_TWO Master Prompt Query Database





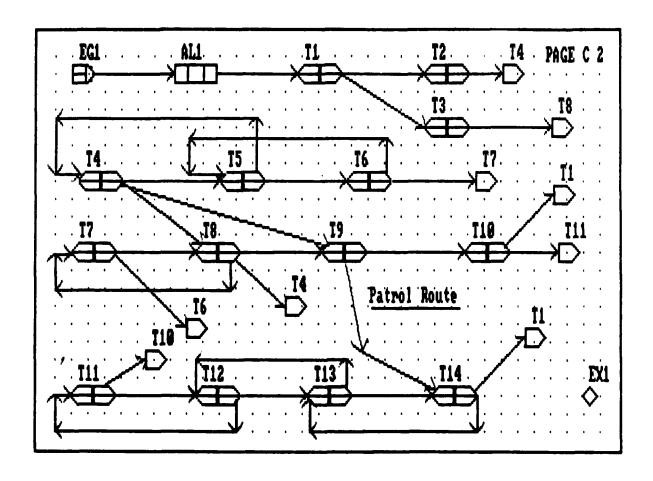


Figure D.21a: Guard Submodel NGHT\_ONE





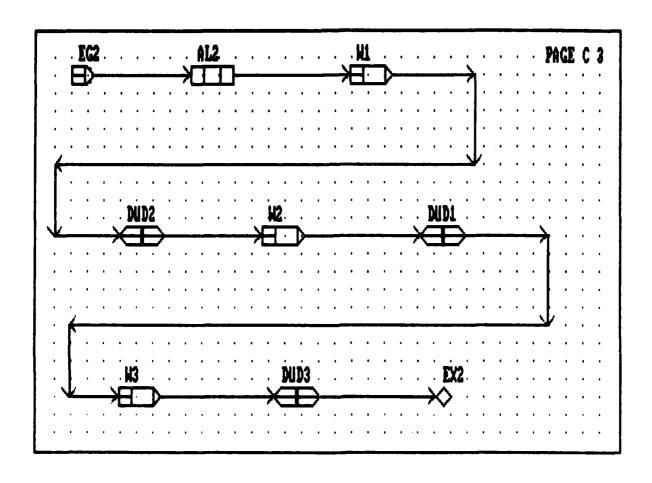


Figure D.21b: Guard Submodel NGHT\_ONE (continued)

#### \*\* GUARD ENGAGEMENT CARD \*\*

TERMINATION COND	ITION	DEFAULT PEBL
SIZE.LE.	.0	F:G1

# \*\* GUARD PENG CARDS \*\*

PENG LAREL	DENG LAHEL	TINC VALUE
PG1 PG2	DG1 DG2	1.00

#### ## GUARD DENG CARDS ##

		EXPOSURE	EXPOSURE	FERCEN	T			
DENG		WHILE	WHILE	TIME	SELF		SUPFRES-	
LABEL	POSTURE	FIRING	RELOADING	DELAY	PUSTURE	ILLUMINATION	SION	TACTIC
DG1	CROUCHING	50.0	30.0	.0	.0	50.0	NO	ASSAULT
DG2	STANDING	30.0	100.0	.0	.0	.0	NO	ASSAULT

#### \*\* GUARD RASE NODES \*\*

NODE	NUMBER OF GUARDS	WEAPON TYPE	PROFICIENCY
B1	5.	PISTOLS	50.0
B2	1.	PISTOLS	.0

# \*\* GUARD ENTER NODES \*\*

NODE	TIME OF	FACILITY	MXTAK
LABEL	ARRIVAL	LOCATION	
EG1 EG2	.00	D1	1 1

#### \*\* GUARD ALLOCATE NODES \*\*

NODE	BASE		
LABEL	LABEL	MXTAE	SIZE
AL 1	B1	1	2.
AL T	B2	1	0.

Figure D.22a: Guard Submodel NGHT\_ONE Echo Report



#### \*\* GUARD TASK NODES \*\*

TASK LABEL	FACIL NODE	MODE	TASK TIN	E D1	STRIBUTION	DOB D	ESIGN	ATION	ELBL	SLBL MXTA	ik_
T1	D1	PATR	CON	(	.300)					1	
T2	****		CON	(	.000)	ACT	(FI	)		. 1	
T4	I 1	•	TF	I (IF	1 .1)					1	
T5	12		TF	I (IF	1 (1)					1	
T6	13		TF	I (IF	1 (1)				EX1	1	
T7	14		TF	I (IF	I (1)					1	
TB	15		TF	I (IF	1 (1)					1	
T9	D1		CDN	(	.300)					1	
T14	05		TF	1 (OF	'I ,1)					1	
T13	04		TF	I (OF	1 1)					1	
T12	0.2		TF	I (OF	1 (1)				EX1	1	
T11	02		TF	I (OF	1 (1)					1	
T10	01		TF	I (OF	1 (1)					1	
T3	***		CON	(	.000)	DIS	(FI	)		1	
DUD2	****		00	(	.000)	CAL	L (MAC	(2)		1	
DUD1	****		CON	(	.000)	CAL	L (MAC	(1)		1	
DUD3	****		CDN	(	.000)	REC	O ( TT 1	•		1	

TASK	ENGA	SEMENT POIN	TERS
LABEL	FLBLE	DISTANCE	PEBL
T6	TAR1	4.000	PG2
T12	03	10.000	PG1
	LADR	12,000	PG1
	ROOF	20,000	PG1

#### \*\* GUARD WAIT NODES \*\*

NODE	TRIGGERS	MERGE/ TRANSFER ELBL SLBL MXTAK	ENGAGEMENT POINTERS FLBLE DISTANCE PEBL
W1	ADD M1 TRIGGERE	) 1	
W2	GUARD AT	11	
	.OR.GUARD AT	12	
	.OR.GUARD AT	13	
	.OR.GUARD AT	14	
	.DR.GUARD AT	15	
M2	ENGAGEMENT AT	TAR1 1	

\*\* GUARD SIGNAL NODES \*\*

NODE
LABEL SIGNAL OPTION MXTAK
NO SIGNAL NODES

Figure D.22b: Guard Submodel NGHT\_ONE Echo Report (continued)



```
PATROL Sets the characteristics of the guard patrol.

1,2,3;
TOTAL Sets patrol characteristics and other parameters.

1,2,3/
4;
DEFAULT Automatically select default parameters, if any exist.

0;
```

Figure D.23: Guard Submodel NGHT\_ONE Prompt Query Set Database

```
@1,1;
1, "ENTER SIZE OF GUARD PATROL?", 2,1,5;
@2,0;
 0,"
     HG - HANDGUNS",1;
 o," SG - SHOTGUNS",1;
 0,"
     SA - SEMIAUTOMATICS",1;
     SM - SUBMACHINEGUNS",1;
     FA - FULLY AUTOMATIC",1;
 O," NW - NO WEAPONS",1;
 O, "ENTER THE TYPE OF WEAPONS",1;
 3," USED BY GUARD PATROL FORCE ?", HG, HG, SG, SA, SM, FA, NW;
@3,1;
 2, "ENTER THE PROFICENCY OF THE GUARD PATROL?", 50.0,0.0,100.0;
@4,1;
 0,"
     HG - HANDGUNS",0;
 o," SG - SHOTGUNS",0;
 o," SA - SEMIAUTOMATICS",0;
 o," SM - SUBMACHINEGUNS",0;
 o," FA - FULLY AUTOMATIC", O;
 O," NW - NO WEAFONS",O;
 O, "ENTER THE TYPE OF WEAPONS", 1;
 3," USED BY AUGMENTATION FORCE ?", HG, HG, SG, SA, SM, FA, NW;
```

Figure D.24: Guard Submodel NGHT\_ONE Master Prompt Query Database



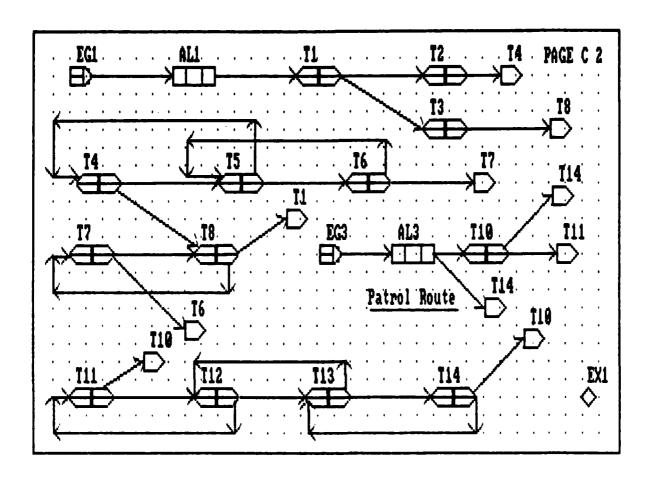


Figure D.25a: Guard Submodel NGHT\_TWO



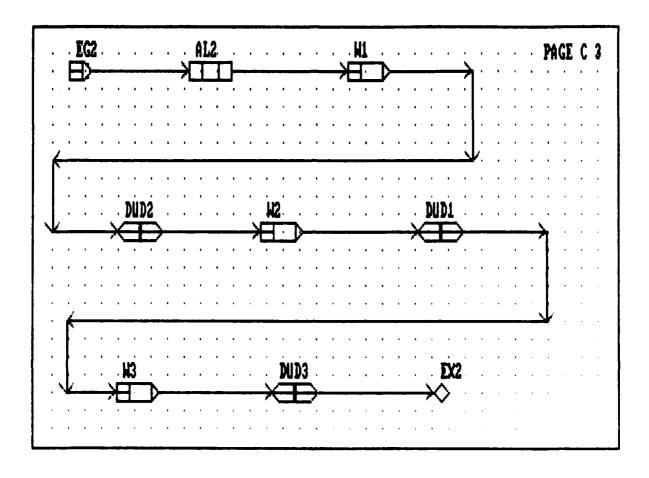


Figure D.25b: Guard Submodel NGHT\_TWO (continued)





*********		******	**********	***
•				•
. ECHO CHEC	K FOR THE	GUARD	BUBMODEL	•
•				
*********	*******	******	*********	***

#### \*\* BUARD ENGAGEMENT CARD \*\*

TERMINATION CONDI	TION	DEFAULT PEBL
SIZE.LE.	.0	PG1

# \*\* GUARD FENG CARDS \*\*

PENG LABEL	DENG LABEL	TINC VALUE
F:G1	DG1	1.00
FG2	DG2	1.00

#### \*\* GUARD DENG CARDS \*\*

		EXPOSURE	EXPOSURE	PERCEN	T			
DENG		WHILE	WHILE	TIME	SELF		SUPFRES-	
LABEL	POSTURE	FIRING	RELOADING	DELAY	POSTURE	ILLUMINATION	SION	TACTIC
DG1	CROUCHING	50.0	30.0	.0	. 0	50.0	NO.	ASSAULT
DG2	STANDING	30.0	100.0	,0	.ŏ	.0	NO	ASSAUL T

# \*\* BUARD PASE NODES \*\*

NODE LAREL	NUMBER OF GUARDS	WEAF (IN TYPE	FROFICIENCY
B1	5.	FISIOLS	50.0
B2	1.	FISTOLS	

#### .. GUARD ENTER NODES ..

NODE LA <b>B</b> EL	TIME OF ARRIVAL	FACILITY LOCATION	MXTAL
EG3	, (H)	01	1
EGI	.00	D1	1
E62	(R)	****	1

# .. BUARD ALLOCATE NODES ...

NODE	BASE		
LAREL	LAHEL	MXTA	SIZE
🗪 3	P 1	1	1.
AL 1	<b>P</b> 1	1	1.
AL ?	<b>B</b> 2	1	0.

Figure D. 26a: Guard Submodel NGHT\_TWO Echo Report





TASK LABEL	FACIL NODE		TASK	TIME	DISTR	IBUTION	DOE	DES	I GN	AT1ON	El.bt.	SEFE	MXTA
T14	05			TRI	(OPI,	1)							1
T10	01			TRI	(OPI	1)							1
T11	02			TRI	(OPI	1)							1
T12	03			TRI	(OPI	1)					EXI		1
T13	04			TRI	(OPI	1)							1
T1	Di	PATR		CON (		(00)							1
T2	****			CON	. 0	00)	A	CT	FI	)			1
T4	I i			TRI	(IPI .	1)							1
T5	12			TRI	(IPI	1)							1
T6	13			TRI	(IPI	1)					EXI		1
T7	14			TRI	(IPI	1)							1
TB	15			TRI	(IFI .	1)							1
T3	****			CON (		(00)	U	IS (	FI	)			1
DUD2	***			CON(		100)	C	ALL (	MAC:	2)			1
DUD1	***			CON	. 0	100)	C	ALL (	MAC	1)			1
DUD3	****			CON		100)		ECO (					1

TASK	ENGA	SEMENT POINT	TER8
LABEL	FLBLE	DISTANCE	PEBL
T12	83	10.000	PG1
112	LADR	12.000	PG1
	ROOF	20.000	PGI
T6	TAR1	4.000	FG2

\*\* GUARD WAIT NODES \*\*

NODE LABEL	TRIGGERS	MERGE/ TRANSFER	ELBL SLBL MXTAL	ENGAGEMENT FOINTERS FLBLE DISTANCE PERL
W1	ADD M1 TRIGGERE	)	1	
W2	GUARD AT	I i	1	
	.OR.GUARD AT	12		
	.OR.GUARD AT	13		
	.OR.GUARD AT	14		
	.OR.GUARD AT	15		
W3	ENGAGEMENT AT	TAR1	1	

\*\* GUARD SIGNAL NODES \*\*

NODE

LABEL SIGNAL OPTION MXTAR

NO SIGNAL NODES

```
PATROL Sets the characteristics of the guard patrol.

1,2,3,5!
TOTAL Sets patrol characteristics and other parameters.

1,2,3/
4,5!
DEFALLY A tomatically select default parameters, if any # 131.
```

# Figure D.27: Guard Submodel NGHT\_TWO Prompt Query Set Database

```
21.1:
1. SHIER SIZE OF INTERIOR GUARD FATEULT .1.1.5:
e2.0:
0,"
    HG - HANDGUNS",1:
0." 5G - SHOTGUNS".1:
0," SA
           SEMIAUTOMATICS .:
0." SM - SUBMACHINEGUNS",1:
U." FA - FULLY AUTOMATIC".1:
O." NW - NO WEAFONS",1:
O, "ENTER THE TYPE OF WEAPONS", 1:
 I," USED BY GUARD FATROL FORCE "".HG.HG.SG.SA.SM.FA.NW:
Q-, 1:
 2. "ENTER THE PROFICENCY OF THE GUARD PATROL ? . 50.0.0.0.1.100.0.1
@4,::
O."
     HG - HANDGUNS", 0:
O," SG - SHOTGUNS", O:
O." SA - S IAUTOMATICS", O:
O. " St - F MACHINEGUNE", O:
     FA - - GULLY AUTOMATIC",0:
O." NW - NO WEAFONS", O:
O, ENTER THE TYPE OF WEAPONS", 1:
7," USED BY AUGMENTATION FORCE ",HG,HG,SG,SA,SM,FA,NW:
@5,1:
1," ENTER SIZE OF EXTERIOR GUARD FATROLT",1,1,5;
```

Figure D.28: Guard Submodel NGHT\_TWO Master Prompt Query Database

# Adversary Submodel

Figures D.29 through D.36 show the two adversary submodels.

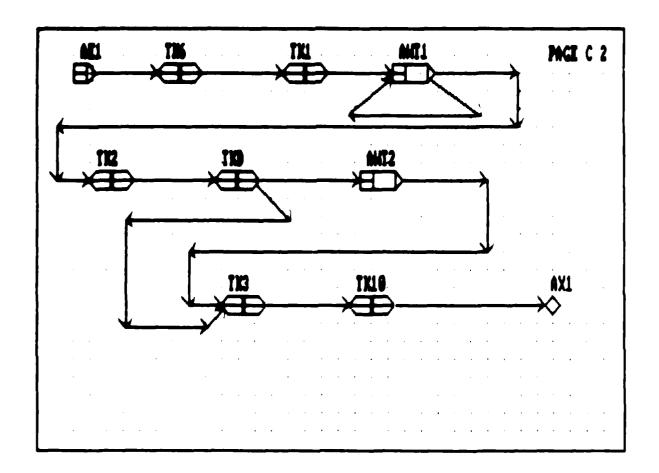


Figure D.29: Adversary Submodel ATT\_GRD





ECHO CHECK FOR THE ADVERSARY SUBMODEL

#### \*\* ADVERSAR ENGAGEMENT CARD \*\*

TERMINATION CONDITION	IUM	DEFAULT	PEUL
SIZE.LE.	. (1		PAL

#### \*\* ADVERSARY DEJECTIVE \*\*

OBJECTIVE	1	Æ	ιÆ	TS
		-	- •	
SAROTAGE		16	M < 1	

#### \*\* ADVERSARY FENG CARDS \*\*

PENG LABEL	DENG LABEL	TINC VALUE
FAI	DAI	.000
PA2	DAZ	.000
PAT	DAT	.000
PA4	DA4	.000

#### \*\* ADVERSARY DENG CARDS \*\*

		EXPOSURE	EXPOSURE	PERCEN	ſ			
DENG		WHILE	WHILE	TIME	SELF		SUFTRES-	
LABEL	POSTURE	FIRING	RELOADING	DELAY	POSTURE	ILLUMINATION	STON	TACTIC
DAI	CROUCHING	50.0	30.0	.0	.0	50.0	M()	ASSAULT
DA2	STANDING	100.0	100.0	. (1	80.V	10.0	NO	ASSAULT
DA3	CROUCHING	30.0	20.0	.0	.0	JO. 0	14(1	ASSAUL T
DA4	STANDING	50.0	40.0	.0	.0	.0	NO	ASSAULT

# \*\* ADVERSARY ENTER NUDES \*\*

NODE LABEL	BIZE	WEAPON TYPE	PROFICIENCY	TIME OF ARRIVAL	FACILITY LOCATION	
AE1	3.	PISTOLS	50.00	,00	****	1

Figure D.30a: Adversary Submodel ATT\_GRD Echo Report



#### \*\* ADVERSARY TASK NODES \*\*

TASK LABEL	FACIL NODE	MODE	TASK TIME DISTRIBUTION	DUB DESIGNATION	ELBL SUR	MXTAL
TK6	****	ENTE	UNF( .000, 100,000,1)			1
TK1	03	ENTE	CON( 1.000)		CON1	1
TK2	LADR	ENTE	RNO( 6,1)		CONT	1
TKD	ROOF	ENTE	CON( .000)		CONT	1
TK3	CUT	PENE	UNF ( 4.000, 9.000,1)			1
TK10	TARI		CON ( 6.000)		CONT	1

TASK	ENGA	BEMENT POIN	TERS
LABEL	FLBLE	DISTANCE	PEBL
TK1	03	10.000	PAI
TK2	03	10.000	PA2
TKD	03	10.000	PA3
TK10	13	4.000	PA4

# \*\* ADVERSARY WAIT NODES \*\*

NODE LABEL	TRIGO	ERS		MERGE/ TRANSFER	ELBL	SLBL	MXTAL.		MENT FOIN DISTANCE	
AWT1	NOT. ADVERSARY	AT	LADR		CONT		2	U3	10.0	PA1
AWT2	ADVERSARY	AT	ROOF	MERGE	CONT		1	U3	20.0	PA3
	.OR.NOT.ADVERSARY	AT	03							
	. AND. NOT. ADVERSARY	AT	LADR							

# \*\* ADVERSARY SIGNAL NODES \*\*

NODE LABEL	SIGNAL OPTION	MXTAK
	NO STENOI NODES	

Figure D.30b: Adversary Submodel ATT\_GRD Echo Report (continued)

```
ATTACK Sets the parameters of aversary force.

1,2;
MISSION Sets the mission criteria.

4;
TOTAL Sets both adversary force parametes and mission criteria.

1,2,4;
DEFAULT Automatically select default parameters, if any exist.

0;
```

Figure D.31: Adversary Submodel ATT\_GRD Prompt Query Set Database

```
Q1,1;
0,"
      HG - HANDGUNS",1;
      SG - SHOTGUNS",1:
ο,"
     SA - SEMIAUTOMATICS",1;
O," SM - SUBMACHINEGUNS",1;
O," FA - FULLY AUTOMATIC",1;
O," NW - NO WEAPONS",1;
 O, "ENTER THE TYPE OF WEAPONS", 1;
3," USED BY THE ADVERSARY FORCE ?", HG, HG, SG, SA, SM, FA, NW;
@2,1;
 2, "ENTER THE PROFICENCY OF THE ADVERSARY FORCE?", 50.0,0.0,100.0;
@3,1;
2, "NOT REALLY A PROMPT QUERY ",0.0,0.0,100.0;
@4,1;
O, "ENTER THE TASK TIME FOR THE ADVERSARY", 1,
2," FORCE AT THE TARGET LOCATION?",6.0,5.0,20.0;
```

Figure D.32: Adversary Submodel ATT\_GRD Master Prompt Query Database

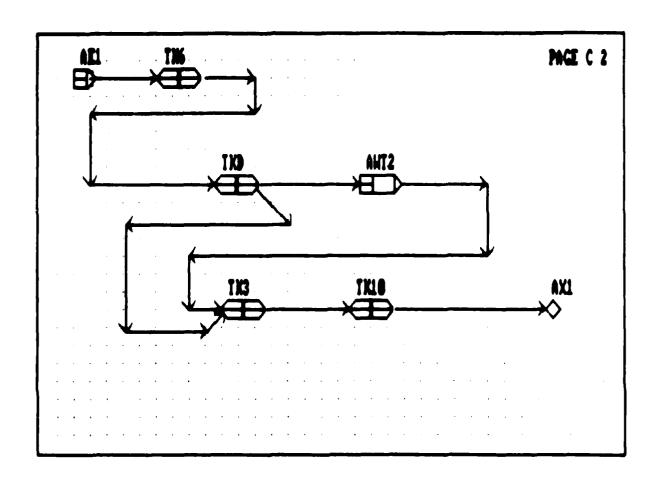


Figure D.33: Adversary Submodel ATT\_AIR





ECHO CHECK FOR THE ADVERBARY BUBHIDDEL.

#### .. ADVERGAN ENGAGEMENT CARD ..

-	ION COMDI	TION	DEFAULT PERL
9.1	ZE.LE.	.0	FAI

#### .. ADVERSARY DOJECTIVE ..

ODJE	CT	i ve	TARGE.	18
200	ΩŤ	400	TARI	

# .. ADVERSARY PENS CARDS ..

PENS LASEL	DE NO L ASEL	TINE VALUE
PAI	DAI	, teop
FAZ	DN2	, UHA
PAS	Dn3	, (HJH)
PA4	DA4	.000

# .. ADVERSARY DENS CARDS ..

		EXPOBURE	EXPOSURE	PERCENT				
LABEL	POSTURE	WHILE FIRING	MITLE RELOADING	TIME	RELF POBTURE	ILLUMINATION	BUFFRES	TACTIC
DAI	CROUCHING	50.0	30.0	.0	,11	<b>50.</b> 0	NO	ABBAUL T
DAZ	STANDING	100.0	100.0	.0	■0.0	50.0	NO	ASSAUL T
DA3	CROUCHINE	30.0	20.0	.0	.0	50.0	NO	ABBAUL T
DA4	STANDING	50.0	40.0	.0	. 0	.0	NO	ABSAUL T

# .. ADVERSARY ENTER NUDES ..

NODE LABEL	BIZE	WEAPON TYPE		TIME OF ARRIVAL	FACILITY LOCATION	MXTAH:
AE1	3.	PISTOLS	50.00	.00	****	1

Figure D. 34a: Adversary Submodel ATT\_AIR Echo Report



#### .. ADVERSARY TASI NODES ...

TABL	FACIL							
LADEL	NODE	HODE	TAS	TIME DISTRIBUTION	DUR DESIGNATION	EI BI	લ મ	MXTA
			<b>-</b>					
TKG		ENTE	UNF (	.000, 100.000,1)				1
TKD	ROOF	ENTE		CDN ( , QUO)		CONT		1
TK3	CUT	PENE	UNF	4.000, 9.000,1)				1
TKIO	TARL			CON( 6,000)		CUNT		1

TASF	ENBA	SEMENT POIN	TERS
LADEL		DISTANCE	PEBL
TKD	03	10,000	PA3
TK10	13	4.000	PA4

## .. ADVERBARY WATT NODES ..

NODE				MERGE /				ENGAGE	EMENT POLI	NTERS
LABEL	TRIGU	ERS		TRANSFER	ELBL	BLPL	MXTAL	FLBLE	DISTANCE	PEBL
AWT2	ADVERSORY	AT	ROOF	HERGE	CONT			03	20.0	FA3
	. DR. NOT. ADVERS: RY						-		•	
	. AND . NOT . ADVERSARY	AT	LADR							

#### \*\* ADVERSARY SIGNAL NODES \*\*

NODE LABEL	SIGNAL OFTION	MXTAH
	NO SIGNAL NODES	

Figure D.34b: Adversary Submodel ATT\_AIR Echo Report (continued)





```
ATTACK Sets the parameters of aversary force.

1,2;
MISSION Sets the mission criteria.

4;
TOTAL Sets both adversary force parametes and mission criteria.

1,2,4;
DEFAULT Automatically select default parameters, if any exist.

0;
```

# Figure D.35: Adversary Submodel ATT\_AIR Prompt Query Set Database

```
@1,1;
 O," HG - HANDGUNS",1;
 o," SG - SHOTGUNS",1;
 O," SA - SEMIAUTOMATICS",1;
 0," SM - SUBMACHINEGUNS",1;
 O," FA - FULLY AUTOMATIC",1;
 O." NW - NO WEAPONS",1:
 O, "ENTER THE TYPE OF WEAPONS", 1;
 3," USED BY THE ADVERSARY FORCE ?", HG, HG, SG, SA, SM, FA, NW;
@2,1;
 2, "ENTER THE PROFICENCY OF THE ADVERSARY FORCE?", 50.0,0.0,100.0;
@3,1;
 2, "NOT REALLY A PROMPT QUERY ",0.0,0.0,100.0;
@4,1;
 O, "ENTER THE TASK TIME FOR THE ADVERSARY", 1,
 2," FORCE AT THE TARGET LOCATION?",6.0,5.0,20.0;
```

Figure D.36: Adversary Submodel ATT\_AIR Master Prompt Query Database



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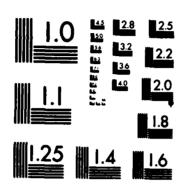
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